

U.S. DEPARTMENT OF COMMERCE

DANIEL C. ROPER, Secretary

COAST AND GEODETIC SURVEY

R. S. PATTON, Director

Special Publication No. 189

QB
275
-435
no. 189
1935

FIRST-ORDER TRIANGULATION IN TEXAS

(1927 DATUM)

BY

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January 1, 2006

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FIRST-ORDER TRIANGULATION IN TEXAS (1927 DATUM)

READJUSTMENT OF THE TRIANGULATION OF THE UNITED STATES

The triangulation of the United States has been built up by continually adding new arcs to those already measured, and for many years the plan had to be followed of fitting new arcs to old ones which had already been adjusted. In doing this it naturally followed that as the last gap in a large loop of triangulation was filled in its adjustment was made to absorb the loop closure, and as these loop closures increased in number and became more and more involved with other loops it became manifest that only the adjustment of the triangulation net of the entire country, either as a whole or in very large sections, would properly distribute many of the systematic errors which it was evident had before been largely crowded into limited closing sections. Only by such unified adjustments would it be possible to obtain geographic positions of uniform quality along the various portions of any arc, or to make the positions given for any arc of the same order of accuracy as those of neighboring arcs. Accordingly, in 1926, an adjustment of the triangulation of the United States to the west of the ninety-eighth meridian was undertaken by a method devised at the office of the Coast and Geodetic Survey.¹ Following the completion of this adjustment, a similar adjustment was made of the triangulation in the eastern half of the country, holding fixed the positions along the ninety-eighth meridian as determined by the western adjustment. As the ninety-eighth meridian divides Texas fairly into two parts, this publication includes results from both adjustments.

The results in this volume are all on the North American datum of 1927, the name that has been given to the combination of the new adjustment and what was previously called the North American datum. There have already been published geographic data for several of the arcs in Texas on the older, or North American, datum. Where the positions along such arcs have been computed on the 1927 datum the positions already published are superseded. The publications thus superseded are: Appendix 6, Report for 1901; Appendix 4, Report for 1903; Appendix 5, Report for 1905; Appendix 5, Report for 1911; Special Publication No. 11; Special Publication No. 54; and Special Publication No. 88. Special Publication No. 17, giving results of third-order triangulation along the coast of Texas, is not superseded, though it contains positions for a few stations for which positions on the 1927 datum are also given in the present volume.

NORTH AMERICAN DATUM OF 1927

The original adjustment of the triangulation in this publication was computed on the Clarke spheroid of reference of 1866, on what was first called the United States standard datum, a name that

¹ For a description of the method used see U.S. Coast and Geodetic Survey Special Publication No. 159.

through adoption of the datum by Canada and Mexico was later changed to North American datum. In the readjustment of the country in 2 large sections, the western half and the eastern half, the same spheroid of reference was used as in the previous adjustment, and only 1 station was held in position. Station Meades Ranch in Kansas was assigned the same position which it held in the original United States standard or North American datum. This position of Meades Ranch is

Latitude: $39^{\circ} 13' 26''.686$

Longitude: $98^{\circ} 32' 30''.506$

This position was held in the new datum because it had been found to be in accord with the country as a whole in the investigation that was carried out at the time of the adoption of the original datum.

The orientation in the new datum is controlled by various Laplace azimuths distributed through the network of the arcs. The position of Meades Ranch, together with the Laplace azimuths included in arcs, serve to define the North American datum of 1927. The date (1927) is appended to the new datum to distinguish it from the old North American datum. A station is said to be on the North American datum of 1927 when it is rigidly adjusted to the scheme of the readjusted triangulation. The engineer using the geographic positions given in any of the publications of the Coast and Geodetic Survey is urged to make certain that all positions used on any project are on the same datum, being careful not to attempt to coordinate surveys based on positions on the two datums without a careful study of the difference between them. It is expected that in the course of the next few years all triangulation stations in the country will be on the new datum; that is, on the North American datum of 1927. At present there are a large number of old and new third-order stations along the coast of Texas for which positions on the new datum are not yet computed, and for which such positions will not be available for several years, or until a certain amount of new field work, of both first-order and third-order quality has been done, and a final coordination and correlation with the readjusted triangulation is made possible. The older work along the coast has already been given the public on the older datum in Special Publication No. 17. The results in that publication are not coordinate with those in the present volume.

ARCS INCLUDED IN THIS PUBLICATION

The triangulation reported in this publication includes all or parts of 13 first-order arcs, and such third-order and intersection stations as were determined directly from those arcs. A later volume will present the results of any first-order triangulation executed in 1934 or later, and the results of third-order triangulation, old and new, along the coastal waterways.

First-order triangulation in Texas goes back to the year 1900 when base lines for controlling the ninety-eighth meridian arc were measured at several places in the State. The first of these was near Bowie, and in 1902 observations of horizontal directions were begun in that vicinity. By the end of 1905 this arc was completed as far as the vicinity of Corpus Christi, and in 1913 it was extended to the Mexican boundary, and a connection made with the triangulation of that country.²

² See U.S. Coast and Geodetic Survey Special Publication No. 54, p. 17.

A general idea of the location of this arc and of the other arcs reported in this volume may be had by consulting the index map at the end of the volume, while more detailed information is given by the sketches which follow it. The years when the arcs were observed may be found accompanying both the positions and the descriptions of stations, and from the descriptions may also be had the names of the engineers who established the stations.

TRIANGULATION IN NEIGHBORING STATES

Triangulation just over the border in adjoining States has been included in this publication in order that all triangulation results now available on the North American datum of 1927 which might be of use for surveys within the State would be contained in the one volume.

Special mention should be made of three triangulation arcs which serve State boundary-survey purposes. Two of these, the Red River arc and the arc along the parallel of $36^{\circ}30'$ serve the standard purpose of determining the geographic positions of boundary monuments established by normal boundary survey methods. The Red River arc determined geographic positions of reference monuments along the south side of the river which were intended to perpetuate the position of the true boundary along the south cut-bank of that stream as determined by a commission and approved by the Supreme Court of the United States. The northern boundary of the "panhandle" of Texas, which was fixed by statute as the parallel of latitude $36^{\circ}30'$, was surveyed by the General Land Office in 1860 and 16 monuments erected along it. In 1932 an arc of first-order triangulation was extended the length of this boundary, and a number of the original boundary monuments tied into it.

The eastern boundary of the "panhandle" presents the unusual case where a boundary, in dispute and failing of settlement by ordinary boundary survey methods, was established by running an arc of first-order triangulation along its length, and from that triangulation determining and monumenting a geodetic meridian as the boundary—in this case the one-hundredth meridian. This was done under the direction of the Supreme Court of the United States, which decreed that "In ascertaining and locating the line of the said meridian the Commissioner shall use the most accurate method known to science and applicable in that locality."

The history of the growth of triangulation from a purely scientific undertaking to an engineering proposition is nowhere better exemplified than by the arcs in Texas herein described. At one end of the scale we have the ninety-eighth meridian triangulation, one of the first major arcs of triangulation to be executed according to rigid specifications as to strength of figures, criteria of accuracy, etc., but done with some of the instrumental and accessory equipment of an earlier period. The use of metallic tapes in measuring a first-order base line was not new with the ninety-eighth meridian work, as the St. Albans base line³ in West Virginia, measured in 1892, was the first such base line in this country to depend primarily on such apparatus; but it was on the ninety-eighth meridian that metallic tapes were first used as standard equipment for measuring first-order

³ See U.S. Coast and Geodetic Survey Special Publication No. 4, p. 150.

base lines. On this arc transportation was by wagon; the necessary elevation of instrument and target was secured by towers of lumber, hauled from the nearest towns, erected with extreme care to secure requisite strength and rigidity, and then abandoned when the work was completed; horizontal directions were observed with heavy though accurate theodolites having circles of 12-inch diameter, read by three micrometer microscopes; and observations were made on heliotropes which could be used only when the sun was shining and on gas lamps requiring constant attention.

At the other end of the scale we find such arcs as the one along the Gulf Coast, executed in 1931, with high-grade automobile trucks for transportation; steel towers for elevating instruments and targets—towers that can be erected to heights of 100 and more feet in less than 5 hours, and taken down in even less time and moved to a new station, and used not once, but a hundred or more times—observations made with a new lightweight, rapid theodolite having a 9-inch circle read by two micrometer microscopes; and for a target a small compact electric lamp operated by a few dry cells, and so dependable that it is now fitted with time switches which will turn the light on and off at predetermined times, and can be left unattended.

GENERAL DESCRIPTION OF TABLES AND SKETCHES

The tables of geographic positions, on pages 19 to 152, also contain the distances between contiguous triangulation stations in both meters and feet, the logarithms of the distances in meters, and the azimuths of the lines joining these stations. The distances are corrected for elevation above mean sea level, and the azimuths are referred to true south. Anyone who wishes to obtain the true distance between two triangulation stations should use the formula given on page 18, and the mean elevation of the stations above mean sea level. Where elevations of occupied triangulation stations are available they are given at the end of the descriptions of those stations.⁴ Elevations of intersection points are given in a separate list on pages 343 to 349.

The descriptions of stations, given on pages 156 to 341, are designed to enable the engineer to recover and identify the station mark, after first guiding him to the immediate locality of the station. There are many of these stations for which the descriptions may become obsolete insofar as descriptions of witnesses and particular surroundings are concerned. Natural changes and the works of man will so modify the surroundings that recovery will become increasingly difficult. Where an engineer visits a station and makes a search for it, he should report the results of such search to the Director of the United States Coast and Geodetic Survey in Washington, D.C. If the station is recovered, the present condition of the marks and surroundings should be reported so that the files in this office may be kept up to date.

The engineer should realize that the triangulation extended over the country by the Coast and Geodetic Survey is a public survey, made for the use of the people, and of especial value to the engineer who desires an accurate base for his detailed surveys and wishes to correlate and coordinate his surveys with the base maps of the country. These stations really belong to the States in which they are located,

⁴ See pp. 343 and 344 for exceptions.

and the engineer who is so fortunate as to find some of these stations located near his work should not only use them to control his own surveys but should aid in perpetuating them for the use of other engineers by reporting their condition to this office. Coast and Geodetic Survey officials will, from time to time, visit the stations that have been established, and re-mark and redescribe them if necessary.

At most of the stations are reference and witness marks that were established as aids in locating the station. These marks are of permanent character (as nearly as may be), and the distance and azimuth of each such mark from the station is supposed to have been carefully made, so that, at least insofar as the reference marks are concerned, if the station mark is lost or destroyed the station can be relocated from them accurately enough for use in third-order and local surveys. On arcs of triangulation executed during the past 3 or 4 years it has been the practice to establish a well-marked point in the neighborhood of each station to serve as an azimuth mark in local surveys. The distance of such a mark from its station is not generally measured with any degree of accuracy, often being estimated or measured with a speedometer, but is sufficiently great to render negligible the ordinary errors that occur in centering an instrument or target. The azimuths of these marks from their stations are given to even seconds, and are usually accurate to within several seconds.

Near the back of this publication will be found a number of sketches which show graphically the approximate locations of the stations, especially with reference to State and county boundary lines. The lines over which main-scheme observations were made are also shown. By consulting these sketches one may learn if there are triangulation stations in the vicinity in which he is working, and the names of the stations that may be of help to him; he should then turn to the index on page 394, and there find the pages on which the geographic positions of the stations occur, and the descriptions, if the points are described.

OTHER PUBLICATIONS OF VALUE TO THE ENGINEER

If an engineer wishes to compute the geographic positions of the stations of any triangulation that he may execute, he should procure a copy of United States Coast and Geodetic Survey Special Publication No. 8 from the Superintendent of Documents, Washington, D.C. The cost of this publication is 25 cents. If he is interested in knowing the lengths in meters of the degrees, minutes, and seconds of latitude or longitude in the region in which he is working, he can obtain them from Special Publication No. 5, which can be purchased for 20 cents from the Superintendent of Documents.

The publications mentioned in the following paragraphs are of interest to engineers, and may be secured from the Superintendent of Documents at the prices given.

Special Publication No. 71, Relation Between Plane Rectangular Coordinates and Geographic Positions, 10 cents. This publication describes the methods of transforming plane coordinates to spherical ones.⁵

The Coast and Geodetic Survey has issued a number of manuals on the various classes of its work. The ones that would be of value

⁵ See pp. 6 and 10 for reference to plane-coordinate systems in this State.

to an engineer in connection with triangulation, including base measurements, are Special Publication No. 120, Manual of First-Order Triangulation, cost 40 cents; Special Publication No. 145, Manual of Second- and Third-Order Triangulation and Traverse, 60 cents; Special Publication No. 137, Manual of First-Order Traverse, 30 cents; Special Publication No. 14, Determination of Time, Longitude, Latitude, and Azimuth, 35 cents; and Serial No. 166, Directions for Magnetic Measurements, 15 cents.

In computing his triangulation the engineer will find that Special Publication No. 138, Manual of Triangulation Computation and Adjustment, cost 50 cents, will be of great assistance to him.

The reader can secure from the Director of the United States Coast and Geodetic Survey, free of charge, several leaflets which describe geodetic surveying and which also show how triangulation can be used in connection with boundary surveys of private and public property.

In order to make geodetic control data of greater use to engineers and surveyors, an effort is being made to establish one or more plane-coordinate systems in each of the 48 States. When this work has been completed the data for each triangulation station in a State will include its x and y coordinates as well as its latitude and longitude. A brief explanation of plane-coordinate systems is contained in Serial No. 562 of this Bureau. A more detailed publication will be issued in the near future.

CLASSIFICATION OF TRIANGULATION

Triangulation is divided into different classes according to accuracy. Four classes of triangulation are now defined by the Federal Board of Surveys and Maps, viz, first-, second-, third-, and fourth-orders. The first three of these are, respectively, equal in accuracy to the classes primary, secondary, and tertiary as formerly defined and used by the Coast and Geodetic Survey.

The ultimate criterion applied in classifying the different grades of triangulation is the actual error in the length of any line. This is indicated by the discrepancy between the measured length of a base line and its length as computed through the triangulation from the last preceding base. In first-order triangulation such discrepancies must not exceed 1 part in 25,000; in second-order triangulation, 1 part in 10,000; and in third-order triangulation, 1 part in 5,000. Before making the comparison between computed and measured lengths the adjustment of the triangulation should be carried to the point where the side and angle equations have been satisfied. It is also necessary to take into consideration the maximum actual error in the measurement of the base lines.

To secure the accuracy indicated above, certain standards are adopted for the field work, the most important of which relates to the closing errors of the triangles or the discrepancy between the sum of the measured angles in a triangle and 180° plus the spherical excess of the triangle. In first-order triangulation the average closing error of the triangles must not be greatly in excess of 1 second; in second-order triangulation it should not be more than 3 seconds; and in third-order triangulation not more than 5 seconds. The shapes of the figures in the triangulation scheme, the frequency of the base lines, the size and type of instrument used, and the number and kind

of observations are all selected with due regard to the accuracy desired.

Under certain conditions the proportionate error in the length of a line as specified above may be found to be exceeded in any class of triangulation. Where two points are fairly close together as compared with the size of the triangulation scheme, the distance between those points may be in error in excess of that indicated by the class of triangulation of the scheme. The accuracy of the computed length of any line can be estimated by computing the ΣR_1 in accordance with the formula for the strength of figures as given in Coast and Geodetic Survey Special Publication No. 145. In any class of triangulation the subsidiary stations will be located with a less degree of accuracy than the main-scheme stations.

CHARACTERISTICS OF FIRST-ORDER TRIANGULATION

The main-schemes of all triangulation arcs contained in this volume are of first-order accuracy. First-order triangulation is done with such accuracy that the average closing errors of the triangles is of the order of 1 second. In order that the angles may have this high degree of accuracy, theodolites are used. The theodolite, as is well known, is similar to the engineers' transit. The main differences are in the excellence of the workmanship, the accuracy of the graduation of the circle, in having micrometer microscopes instead of verniers for reading the circle, and in having a telescope with a high resolving power. Observations are made either on heliotropes, by which the light of the sun is reflected toward the observer, or on acetylene or electric signal lamps. The heliotrope, or lamp, and the theodolite must be centered directly over the station marks.

At certain intervals, depending on the shape of the triangles, base lines are measured. A base is necessarily a side of one of the triangles. As fairly level or only slightly sloping ground is required for the site of a measured base line, it is often necessary to introduce a number of additional triangles in transferring the measured length to the main lines of the triangulation arc. In the older work of the Coast and Geodetic Survey, where the lines of the main scheme were very long, 50 miles and more in length, the base net, as the expansion figure between the base and the main scheme was called, was often very involved. In the work of today only a single quadrilateral is usually required, and in the Stanton base line on the Texas-California arc (see fig. 15 at end of this volume) we find a case where no additional stations were required, the measured line being a line of the regular scheme of the triangulation.

The ends of a base line must be intervisible from the ground or from towers that may be erected over them. In the early years of the Coast and Geodetic Survey's existence the base lines were measured with metal bars, but near the beginning of the present century steel tapes began to be used in the measurements. Since 1907 all of the base lines of the survey have been measured with invar tapes. The probable error of a measured base is about 1 part in 1,000,000 of its length. This accuracy meets all requirements of engineering and science.

The azimuths of the triangulation depend upon what are called Laplace azimuths, or azimuths determined by observations on Polaris which have been corrected for deflection of the vertical. These

deflections are due to the attraction of mountain or plateau masses that are comparatively near the place at which the observations are made. The probable error of a Laplace azimuth is about ± 0.3 second.

If one is interested in the accuracy with which the triangulation of the Coast and Geodetic Survey is done and the reliability of the geographic positions which are given in this publication, he should consult United States Coast and Geodetic Survey Special Publication No. 159, the Bowie Method of Triangulation Adjustment as Applied to the First-Order Net in the Western Part of the United States.

SUPPLEMENTARY STATIONS

In addition to the stations which form the main network of triangulation reported in this volume, a number of objects, such as mountain peaks, church spires, smokestacks, and boundary survey monuments, were observed on from stations of the main scheme. The geographic positions for such points have been computed and are given for each arc immediately after the positions for the main-scheme stations. Reference to the sketches at the end of this volume will show the general location of such stations, and by consulting the index one may find the pages on which the positions are given, and also the descriptions if available. As a rule the name of the supplementary station as given in the list of geographic positions is sufficiently comprehensive for its accurate identification by the engineer who may wish to use it.

In the readjustment of the triangulation of the western part of the United States (see p. 1) each of the unoccupied or intersection stations was computed by means of a single triangle, even though several additional lines had been observed. If the lengths and azimuths of any of these additional lines are needed at any time, the data may be obtained by writing to the Director, Coast and Geodetic Survey, Washington, D.C.

Among the supplementary stations will be noticed an occasional one for which the latitude and longitude are given only to two decimal places of seconds, and azimuths only to nearest seconds. Such positions are indicated by a footnote as being without check. This means that they have been obtained from the intersection of only 2 observed directions, and since any 2 observed directions which intersect will furnish data for computing a geographic position, there is no means of knowing that the same point was observed on from both stations. Such data is usually satisfactory for ordinary mapping purposes, but should be used with extreme caution, and rejected if they give unsatisfactory closures. Where positions of mountain peaks are given as intersection stations, it must be remembered that the point observed on is the highest point as it appears from the occupied station, and that a peak which appears as a sharp tip from one direction may present a wholly different aspect from some other direction.

USE OF HORIZONTAL CONTROL DATA

The plan or map for any extensive engineering project, whether or not map construction is the primary object, should have all its parts properly correlated and should be on the same datum as adjacent surveys. Federal and State mapping organizations have long been aware of the necessity of having all surveys based upon a common

datum, but local engineers and surveyors in this country have too often in the past been content, and in many cases compelled, to use a local datum for their surveys. The future economic disadvantage of such a system is now becoming recognized, with the result that city and county surveys are being more generally placed upon a permanent basis by connecting them to stations on the North American datum of 1927.

One other factor must be taken into consideration by the engineer of today. As the States develop industrially they will undoubtedly follow the lead of an Eastern State, Massachusetts, which with splendid foresight has extended its triangulation control over the entire State for the purpose of defining property boundaries in terms of standard coordinates. The advantage of such a system is well stated in the following extracts from the report on the Maryland oyster survey:

The difficulties of accurately locating and permanently defining the boundaries of a farmer's plantation on land, even with the aid of monuments, public roads, streams of water, and other points of reference, are often great, judging from the disputes frequently arising in connection with boundaries.

There is only one point on the earth's surface at the intersection of any one parallel of latitude and any one meridian of longitude, and therefore there can be no dispute as to the meaning of such a geographic definition of the location of a point, even though all the original triangulation station marks used in its determination, together with the chart on which its position was originally plotted, have been totally destroyed.

In the case of the destruction of an original triangulation station mark, or any other point defined by a geographic position, a competent geodetic engineer can reestablish its exact location by a new system of triangulation connecting with other distant triangulation marks which have not been destroyed.

The same reasons which have influenced cities and counties to use geodetic control on which to base their many surveying and mapping projects and to place those surveys and maps on a permanent basis by connecting them to stations on the North American datum of 1927, are today inducing corporations and others controlling large tracts of land to discontinue the practice of making surveys of their boundaries and larger subdivisions by means of traverse and to substitute therefor geodetically controlled surveys on the national datum.

Even where there are no triangulation stations available on the North American datum of 1927 it will be found advisable to use geodetic methods for the survey of large areas, and to monument the geodetic points in as permanent a manner as possible, since it is expected that in the course of a few years the triangulation net of the country will be extended into every section of the country, and connections can be made with local surveys for which marked points still exist and such local surveys given a more nearly permanent status than they would otherwise have.

In a section of the country covered by adequate geodetic control the data are available for any of the following operations, in addition to their possible future use as a basis for cadastral surveys:

1. **Extensive mapping.**—The topographer needs as initial data for beginning a topographic survey the distance and direction between two points and the geographic position of one of them in latitude and longitude. His local triangulation or traverse based on this control, will prevent the accumulation of excessive errors as he carries on his mapping operations. In the event that the available first-order triangulation of that region has lines of too great length to join to

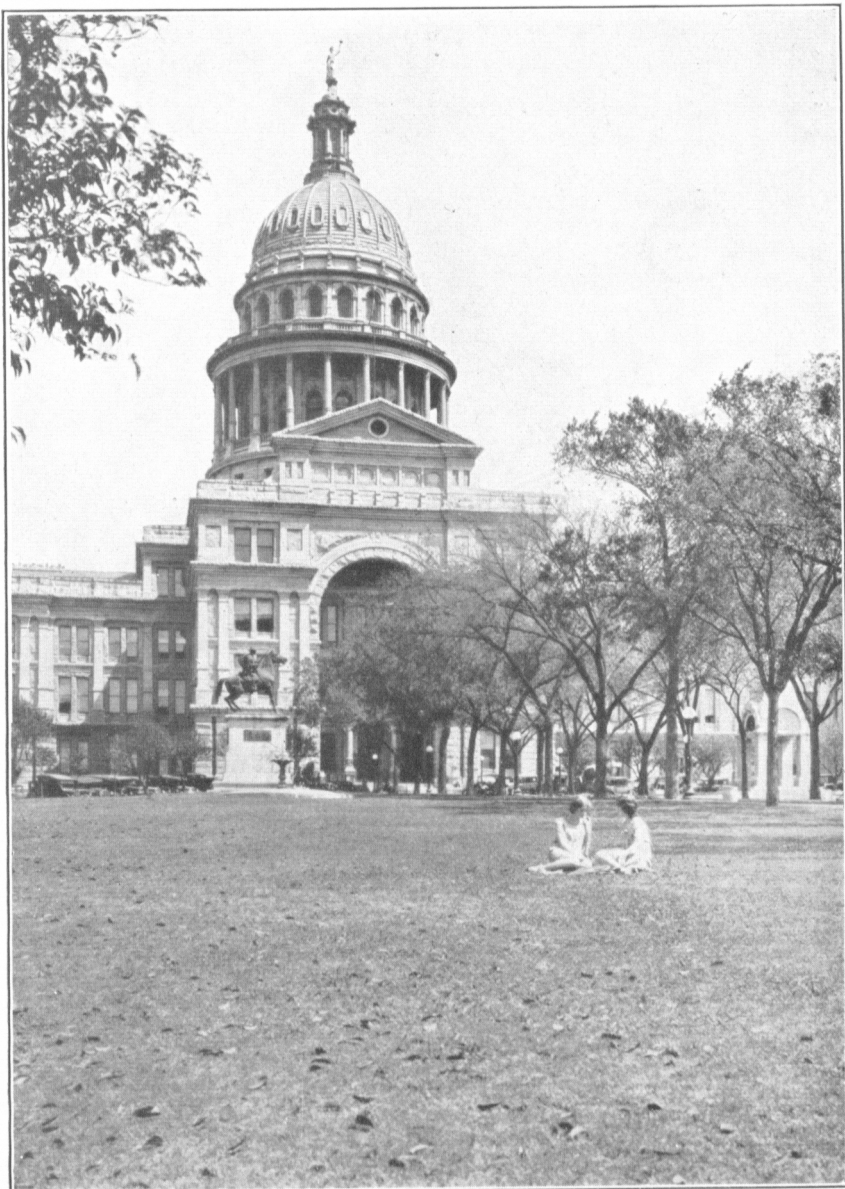
conveniently, he can measure a base and azimuth at some place visible from a first- or second-order triangulation station and connect his base to the station by triangulation, thus obtaining proper geographic positions for his local surveys. Along the extensive coastal plains bordering the Gulf of Mexico where large areas have been mapped by photographing from the air the use of triangulation on the standard datum has been found particularly satisfactory in coordinating the resulting maps and fully correlating them in scale.

2. **Boundary lines.**—If it is desired to locate or to delimit accurately and permanently the boundaries of political subdivisions, such as States, counties, or cities, the same methods may be used as in controlling other extensive surveys. Wherever possible, a line of the adjusted triangulation or traverse should be used as a basis for local surveys, rather than a point, since a line gives the three essentials of position, length, and direction. In the work of the Coast and Geodetic Survey, where a new arc takes position, length, and azimuth from a line of an earlier survey, it is the practice to always recover and tie in a third station of that survey, and prove by the absence of relative change the integrity of the recovered stations.

3. **Local intensive surveys.**—The necessity for such surveys arises most frequently in connection with extensive improvements over a considerable area or as a basis for city or regional planning, where the needs of a city or metropolis are being anticipated for a number of years. Here the requirements are somewhat different from those in the two preceding operations, for it is often necessary to extend first- or second-order control in considerable detail over the entire area affected, third-order triangulation or traverse then being used to furnish additional points for the survey. Such control survey should invariably be started from a line of the adjusted triangulation or traverse, and should, if possible, close on another such line.

While the azimuth and length of one line of the adjusted triangulation or traverse and the geographic position of one end of such a line constitute the data essential for the complete utilization of old work as a basis for new work, it will be noted in the preceding paragraphs that the engineer is advised to base his new work on at least three old stations. There is always grave danger of depending upon a minimum of data. There may be failure to identify the true station mark, or the mark, though genuine, may have been tampered with or otherwise disturbed in position. This will, of course, introduce an error into the new work based on these stations. The integrity of the recovered points may be established by using at least three old stations as a basis for new work, the third station serving as a check for the two stations on which the new work may actually depend.

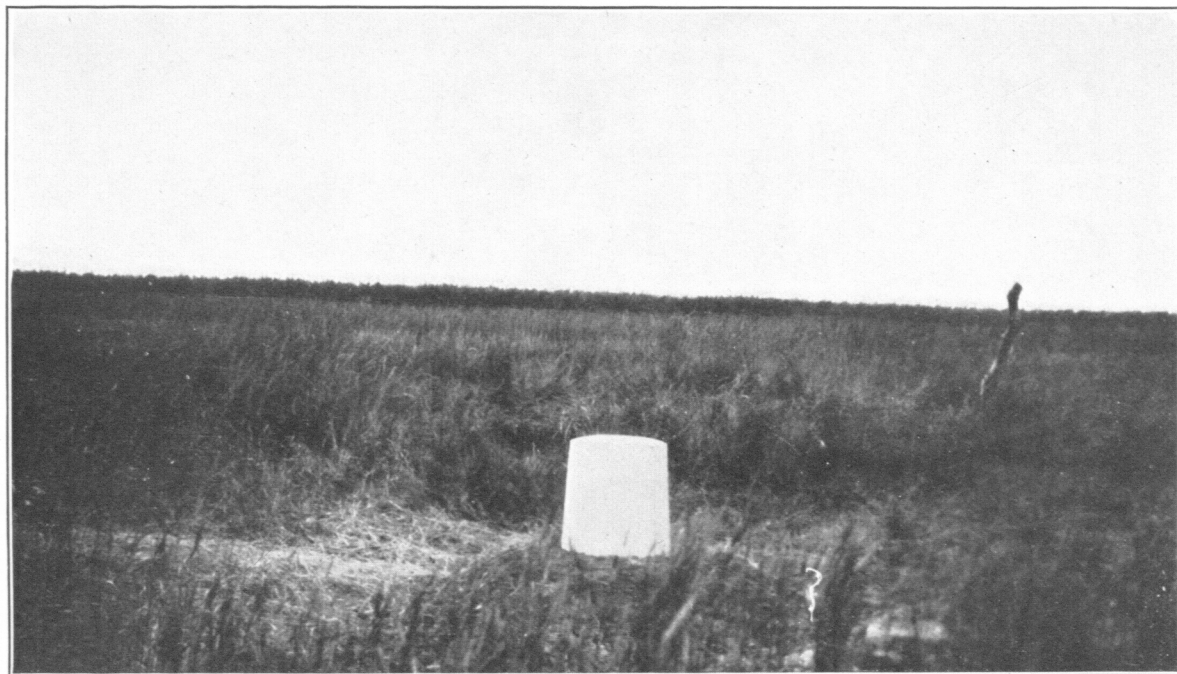
In local surveys where the area is of limited extent it is usually desirable to use a system of plane coordinates, the origin being connected to some point of the first- or second-order triangulation or traverse. Tables for computing plane coordinates from geographic positions are found in Coast and Geodetic Survey Special Publication No. 71. As related on page 6, State-wide systems of rectangular plane coordinates have been adopted for the various States, and eventually all the triangulation stations in Texas will be computed on one of the five systems which have been adopted for that State. The Coast and Geodetic Survey will be glad to give advice on any problem arising out of the use of its control points on any proposed extension of triangulation or traverse from them.



Courtesy of the National Geographic Society.

FIGURE 1.—THE TEXAS STATE CAPITOL.

The latitude and longitude of the star in the hand of Liberty on the dome have been determined by triangulation (see index).



Courtesy of Hugh B. Crawford, General Land Office.

FIGURE 2.—THE NORTHEAST CORNER OF TEXAS, 1928.

The latitude and longitude of this boundary monument have been determined by triangulation (see index). It is a station of the national control net, and is connected by continuous triangulation with the State Capitol (see fig. 1) which is also a station of that net.

EXPLANATION OF TABLE FOR POLYCONIC MAP PROJECTION

The engineer or surveyor who makes use of the data in this publication may find it desirable to construct a map covering the territory he is surveying. He may wish to show on this map the meridians and parallels so as to be able to plot the positions of the triangulation stations included in the area and show the details of his survey in correct geographic positions. To enable him to do this with the least possible difficulty, the following table, reprinted in abbreviated form from Coast and Geodetic Survey Special Publication No. 5, has been inserted. This table may also be used to interpret in terms of degrees, minutes, and seconds of arc any relatively short distance measured along a meridian or parallel. The method of using the table is described below.

To make a projection for a large-scale map (1 to 20,000 and larger), first draw a straight line for a central meridian and a construction line ab perpendicular thereto, each to be as central to the sheet as the selected interval of latitude and longitude will permit. (See fig. 3.) On the central meridian lay off, on the desired scale, the distances mm_2 and mm_4 , using the length of 1 minute along the meridian for the latitude of m , as given in the table in the column headed "Arc of the meridian, 1'", and multiplying this length by the number of minutes for the interval between the central parallel and the extreme parallels. Through m_2 and m_4 draw straight lines, cd and ef , parallel to the line ab . On the lines ef , ab , and cd lay off to the scale of the map the distance m_4x_2 , mx_2 , and m_2x_2 on both sides of the central meridian, taking the values from the column headed "Arc of the parallel, 1'", corresponding to the latitude of m_4 , m , and m_2 respectively. The value of 1 minute as taken from the table must be multiplied by the number of minutes out from the central meridian. Draw straight lines through the points thus determined for the extreme meridians—that is, through the x_2 points.

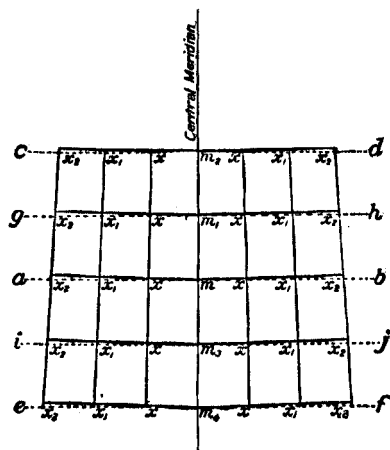


FIGURE 3.—Sketch showing construction of polyconic map projection.

Note.—In this figure the angle made at the central meridian by the parallels is grossly exaggerated. In an actual projection the parallels appear practically as straight lines.

At the two points designated x_2 on the line ab lay off along the meridians the value of Y as given under " Y coordinate of curvature", using as argument the interval in minutes between the central meridian and the extreme meridian. Draw straight lines from these points to the point m for the middle parallel, and from the points of intersection with the extreme meridians lay off distances along these meridians, above and below, equal to the distances $m m_2$ and $m m_4$ to locate points in the extreme parallels.

Subdivide each of the three meridians and three parallels already determined into parts corresponding with the projection interval and join the corresponding points of subdivision by straight lines to complete the projection.

The method outlined above may be used for all large-scale maps, regardless of the number of meridians and parallels shown. For small-scale maps the method is somewhat more complicated, and it becomes necessary to make use of Special Publication No. 5, which may be obtained for 20 cents from the Superintendent of Documents, Washington, D.C.

1

Polyconic map projection table

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 25°
	1"	1'	1"	1'		
$^\circ$ ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	$^\circ$ ' <i>Meters</i>	<i>Meters</i>
25 00	28.042	1,682.5	30.769	1,846.13	0 01	0.1
05	28.023	1,681.4	30.769	1,846.15	03	0.9
10	28.004	1,680.3	30.770	1,846.18	05	2.6
15	27.985	1,679.1	30.770	1,846.20	07	5.1
20	27.966	1,678.0	30.770	1,846.22	10	10.3
25	27.947	1,676.8	30.771	1,846.24	15	23.3
30	27.928	1,675.7	30.771	1,846.26	20	41.4
35	27.908	1,674.5	30.771	1,846.28	25	64.6
40	27.889	1,673.3	30.772	1,846.30	30	93.1
45	27.869	1,672.2	30.772	1,846.32	40	165.5
50	27.850	1,671.0	30.772	1,846.35	50	258.5
55	27.831	1,669.8	30.773	1,846.37	1 00	372.3

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 26°
	1"	1'	1"	1'		
$^\circ$ ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	$^\circ$ ' <i>Meters</i>	<i>Meters</i>
26 00	27.811	1,668.7	30.773	1,846.39	0 01	0.1
05	27.791	1,667.5	30.773	1,846.41	03	1.0
10	27.772	1,666.3	30.774	1,846.43	05	2.7
15	27.752	1,665.1	30.774	1,846.45	07	5.2
20	27.732	1,663.9	30.775	1,846.47	10	10.6
25	27.712	1,662.7	30.775	1,846.50	15	23.9
30	27.692	1,661.5	30.775	1,846.52	20	42.6
35	27.672	1,660.3	30.776	1,846.54	25	66.5
40	27.652	1,659.1	30.776	1,846.56	30	95.8
45	27.632	1,657.9	30.776	1,846.58	40	170.2
50	27.612	1,656.7	30.777	1,846.61	50	266.0
55	27.592	1,655.5	30.777	1,846.63	1 00	383.0

Polyconic map projection table—Continued

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y' coordinate of curvature latitude 27°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
27 00	27.571	1,654.3	30.777	1,846.65	0 01	0.1
05	27.551	1,653.1	30.778	1,846.67	03	1.0
10	27.531	1,651.8	30.778	1,846.69	05	2.7
15	27.510	1,650.6	30.779	1,846.72	07	5.4
20	27.490	1,649.4	30.779	1,846.74	10	10.9
25	27.469	1,648.1	30.779	1,846.76	15	24.6
30	27.448	1,646.9	30.780	1,846.78	20	43.7
35	27.428	1,645.7	30.780	1,846.81	25	68.3
40	27.407	1,644.4	30.780	1,846.83	30	98.3
45	27.386	1,643.2	30.781	1,846.85	40	174.8
50	27.365	1,641.9	30.781	1,846.87	50	273.1
55	27.344	1,640.7	30.782	1,846.90	1 00	393.2

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y' coordinate of curvature latitude 28°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
28 00	27.323	1,639.4	30.782	1,846.92	0 01	0.1
05	27.302	1,638.1	30.782	1,846.94	03	1.0
10	27.281	1,636.9	30.783	1,846.96	05	2.8
15	27.260	1,635.6	30.783	1,846.99	07	5.5
20	27.239	1,634.3	30.783	1,847.01	10	11.2
25	27.217	1,633.0	30.784	1,847.03	15	25.2
30	27.196	1,631.8	30.784	1,847.06	20	44.8
35	27.175	1,630.5	30.785	1,847.08	25	70.0
40	27.153	1,629.2	30.785	1,847.10	30	100.7
45	27.132	1,627.9	30.785	1,847.12	40	179.1
50	27.110	1,626.6	30.786	1,847.15	50	279.8
55	27.089	1,625.3	30.786	1,847.17	1 00	403.0

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y' coordinate of curvature latitude 29°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
29 00	27.067	1,624.0	30.787	1,847.19	0 01	0.1
05	27.045	1,622.7	30.787	1,847.22	03	1.0
10	27.023	1,621.4	30.787	1,847.24	05	2.9
15	27.001	1,620.1	30.788	1,847.26	07	5.6
20	26.980	1,618.8	30.788	1,847.29	10	11.5
25	26.958	1,617.5	30.788	1,847.31	15	25.8
30	26.936	1,616.1	30.789	1,847.33	20	45.8
35	26.913	1,614.8	30.789	1,847.36	25	71.6
40	26.891	1,613.5	30.790	1,847.38	30	103.1
45	26.869	1,612.1	30.790	1,847.40	40	183.2
50	26.847	1,610.8	30.790	1,847.43	50	286.3
55	26.825	1,609.5	30.791	1,847.45	1 00	412.2

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y' coordinate of curvature latitude 30°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
30 00	26.802	1,608.1	30.791	1,847.47	0 01	0.1
05	26.780	1,606.8	30.792	1,847.50	03	1.1
10	26.757	1,605.4	30.792	1,847.52	05	2.9
15	26.735	1,604.1	30.792	1,847.55	07	5.7
20	26.712	1,602.7	30.793	1,847.57	10	11.7
25	26.690	1,601.4	30.793	1,847.59	15	26.3
30	26.667	1,600.0	30.794	1,847.62	20	46.8
35	26.644	1,598.6	30.794	1,847.64	25	73.1
40	26.621	1,597.3	30.794	1,847.66	30	105.3
45	26.598	1,595.9	30.795	1,847.69	40	187.1
50	26.576	1,594.5	30.795	1,847.71	50	292.4
55	26.553	1,593.2	30.796	1,847.74	1 00	421.0

Polyconic map projection table—Continued

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 31°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
31 00	26.530	1,591.8	30.796	1,847.76	0 01	0.1
05	26.506	1,590.4	30.796	1,847.79	03	1.1
10	26.483	1,589.0	30.797	1,847.81	05	3.0
15	26.460	1,587.6	30.797	1,847.83	07	5.8
20	26.437	1,586.2	30.798	1,847.86	10	11.9
25	26.413	1,584.8	30.798	1,847.88	15	26.8
30	26.390	1,583.4	30.798	1,847.91	20	47.7
35	26.367	1,582.0	30.799	1,847.93	25	74.5
40	26.343	1,580.6	30.799	1,847.96	30	107.3
45	26.320	1,579.2	30.800	1,847.98	40	190.8
50	26.296	1,577.8	30.800	1,848.00	50	298.1
55	26.272	1,576.3	30.800	1,848.03	1 00	429.3

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 32°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
32 00	26.249	1,574.9	30.801	1,848.05	0 01	0.1
05	26.225	1,573.5	30.801	1,848.08	03	1.1
10	26.201	1,572.1	30.802	1,848.10	05	3.0
15	26.177	1,570.6	30.802	1,848.13	07	6.0
20	26.153	1,569.2	30.803	1,848.15	10	12.1
25	26.129	1,567.8	30.803	1,848.18	15	27.3
30	26.105	1,566.3	30.803	1,848.20	20	48.6
35	26.081	1,564.9	30.804	1,848.23	25	75.9
40	26.057	1,563.4	30.804	1,848.25	30	109.3
45	26.033	1,562.0	30.805	1,848.28	40	194.2
50	26.008	1,560.5	30.805	1,848.30	50	303.5
55	25.984	1,559.0	30.805	1,848.33	1 00	437.0

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 33°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
33 00	25.960	1,557.6	30.806	1,848.35	0 01	0.1
05	25.935	1,556.1	30.806	1,848.38	03	1.1
10	25.911	1,554.7	30.807	1,848.40	05	3.1
15	25.886	1,553.2	30.807	1,848.43	07	6.0
20	25.862	1,551.7	30.808	1,848.45	10	12.3
25	25.837	1,550.2	30.808	1,848.48	15	27.8
30	25.812	1,548.7	30.808	1,848.50	20	49.4
35	25.788	1,547.3	30.809	1,848.53	25	77.1
40	25.763	1,545.8	30.809	1,848.55	30	111.0
45	25.738	1,544.3	30.810	1,848.58	40	197.4
50	25.713	1,542.8	30.810	1,848.60	50	308.4
55	25.688	1,541.3	30.810	1,848.63	1 00	444.2

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 34°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
34 00	25.663	1,539.8	30.811	1,848.65	0 01	0.1
05	25.638	1,538.3	30.811	1,848.68	03	1.1
10	25.613	1,536.8	30.812	1,848.70	05	3.1
15	25.588	1,535.3	30.812	1,848.73	07	6.1
20	25.562	1,533.7	30.813	1,848.75	10	12.5
25	25.537	1,532.2	30.813	1,848.78	15	28.2
30	25.512	1,530.7	30.813	1,848.81	20	50.1
35	25.486	1,529.2	30.814	1,848.83	25	78.3
40	25.461	1,527.6	30.814	1,848.86	30	112.7
45	25.435	1,526.1	30.815	1,848.88	40	200.4
50	25.410	1,524.6	30.815	1,848.91	50	313.1
55	25.384	1,523.0	30.816	1,848.93	1 00	450.8

Polyconic map projection table—Continued

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 35°
	1"	1'	1"	1'		
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>
35 00	25.358	1,521.5	30.816	1,848.96	0 01	0.1
05	25.333	1,520.0	30.816	1,848.99	03	1.1
10	25.307	1,518.4	30.817	1,849.01	05	3.2
15	25.281	1,516.9	30.817	1,849.04	07	6.2
20	25.255	1,515.3	30.818	1,849.06	10	12.7
25	25.229	1,513.7	30.818	1,849.09	15	28.6
30	25.203	1,512.2	30.819	1,849.11	20	50.8
35	25.177	1,510.6	30.819	1,849.14	25	79.3
40	25.151	1,509.1	30.819	1,849.17	30	114.2
45	25.125	1,507.5	30.820	1,849.19	40	203.1
50	25.099	1,505.9	30.820	1,849.22	50	317.3
55	25.072	1,504.3	30.821	1,849.24	1 00	456.9

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature	
	1"	1'	1"	1'		Lat. 36°	Lat. 37°
° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' <i>Meters</i>	<i>Meters</i>	<i>Meters</i>
36 00	25.046	1,502.8	30.821	1,849.27	0 01	0.1	0.1
05	25.020	1,501.2	30.822	1,849.30	03	1.2	1.2
10	24.993	1,499.6	30.822	1,849.32	05	3.2	3.3
15	24.967	1,498.0	30.822	1,849.35	07	6.3	6.4
20	24.940	1,496.4	30.823	1,849.37	10	12.8	13.0
25	24.914	1,494.8	30.823	1,849.40	15	28.9	29.2
30	24.887	1,493.2	30.824	1,849.43	20	51.4	51.9
35	24.860	1,491.6	30.824	1,849.45	25	80.3	81.2
40	24.834	1,490.0	30.825	1,849.48	30	115.6	116.9
45	24.807	1,488.4	30.825	1,849.51	40	205.6	207.8
50	24.780	1,486.8	30.826	1,849.53	50	321.2	324.6
55	24.753	1,485.2	30.826	1,849.56	1 00	462.5	467.6

CONVERSION TABLE

While in this publication the lengths of all lines are given in both meters and feet, it is believed that occasions may sometimes arise where the engineer may desire to make a conversion either from meters to feet or from feet to meters. In earlier publications of this Bureau a complete table of eight pages has been given, but in the later publications there has been substituted the following condensed table. The legal equivalent of 1 meter is 39.37 inches, derived from the international meter, and adopted July 28, 1866.

This table can be used for converting a rather large number of one unit to the corresponding number in the other unit by simply taking the conversion value for each digit of the first number, moving the decimal point if necessary, and adding the values together. For example, to convert 24.6 feet to meters we take from the table the value in meters corresponding to 2 feet and move the decimal point 1 number to the right. We then take the value for 4 feet as given in the table, and next the value for 6 feet, and move the decimal point 1 number to the left. This gives, by rounding off the third decimal place, $6.096 + 1.219 + 0.183 = 7.498$ meters.

Meters	Feet	Feet	Meters
1	3.280833	1	0.3048006
2	6.561667	2	0.6096012
3	9.842500	3	0.9144018
4	13.123333	4	1.2192024
5	16.404167	5	1.5240030
6	19.685000	6	1.8288037
7	22.965833	7	2.1336043
8	26.246667	8	2.4384049
9	29.527500	9	2.7432055
10	32.808333	10	3.0480061

ACKNOWLEDGMENTS

The adjustments of the first-order arcs in this publication form part of the general adjustments of the triangulation of the United States. These adjustments were two in number. The first included the triangulation along the ninety-eighth meridian, and all the triangulation west of that meridian which was available at the time the adjustment was made. The second adjustment included the triangulation east of the ninety-eighth meridian. These adjustments were made under the direction of Dr. O. S. Adams, who was assisted by W. F. Reynolds, H. S. Rappleye, G. L. Fentress, H. P. Kaufman, C. N. Claire, the author, and other members of the Division of Geodesy of this Bureau. The astronomical work necessary to these adjustments was done under the direction of C. H. Swick.

There are given in this volume the results of several arcs of first-order triangulation for which field work was executed after the completion of the general adjustments. These include the arc along the north boundary of the panhandle of Texas (parallel of $36^{\circ}30'$); and the arc running from Amarillo to Stanton and then to Del Rio. The adjustments of these arcs were made in the New York office of this Bureau under the direction of R. L. Pfau, under whose direction the sketches at the end of this volume were also prepared. The descriptions of stations given on pages 156 to 341 were prepared under the direction of the author. Valuable assistance in the final draft of the report, particularly in the checking of descriptions and sketches, was given by R. J. Connor, C. F. Stoneburner, W. R. Schaub, D. C. Ritchie, and Gale Murphy. In the preparation of the text are included many passages adapted from earlier publications of the Bureau, many of which have been quoted verbatim without quotation marks. These extracts and quotations are the development of repeated adaptations to the needs of particular publications, and represent an evolution brought about by the work of many members of the Division of Geodesy, to whom more detailed acknowledgment cannot be made.

EXPLANATION OF TABLES OF POSITIONS

In the tables of positions the latitude and longitude of each point are given on the North American datum of 1927, and there are also given for all except the intersection points, the length and azimuths of each line observed over, whether in one or both directions. For many of the intersection points the azimuths and lengths of only two lines are given, though more lines may have been used in determining the position. No lengths and azimuths are repeated, and for a given line the length and azimuths will be found opposite the position of one or the other of the two stations involved.

To aid in the use of the tables, a column of the logarithms of the lengths in meters is given. It must be remembered that it is the logarithm which is derived first in the computation, the lengths given in the table being then derived from the corresponding logarithms. A final column gives these lengths reduced to feet, the reduction being made from the lengths in meters.

The rule followed in recent publications in this office has been to give the latitudes and longitudes of the stations to thousandths of seconds for all points, the positions of which are fixed by fully adjusted triangulation. Points, the positions of which are given to hundredths of seconds only, are marked by footnotes as being without check (not occupied) or checked by vertical angles only.

In the column giving azimuths, distances, and logarithms of distances, the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case some of the final figures are doubtful. In some cases there is very little doubt of the correctness of the second figure from the right, while in a few cases some doubt may exist as to the correctness of even the third figure from the right.

It may be noted in the following tables of geographic positions that sometimes a name given a station does not conform to local usage. Sometimes it may be the name of a geographical feature, as a mountain, where the observer did not correctly identify the point and the proper name may not be given in the records. Where possible the proper name has been added but the older name is also carried along in order that identification with the original records may not be lost. There are also cases where a station may be given the name of the owner of the land on which it was established, but the name spelled wrong. For the same reasons as given above, the name of the station as given in the original records is continued in the files of this bureau, and in this publication.

There are many proper names of localities, land features, and of persons given in the descriptions of stations on pages 156 to 341 of this publication. It is felt that in some cases these names may be wrong—it sometimes happened that the same name was given two different spellings in the records sent to this office. Although an effort has been made to correct any errors in the spelling of proper names that may have existed in the records of the descriptions of stations, it will be appreciated if anyone noting a name that should be corrected will so inform the Director of the Coast and Geodetic Survey, Washington, D.C.

The tables may be conveniently consulted by using as finders the sketches and the index at the end of this publication. In the third column of the index will be found for each point a reference to the page on which its description is given; in the fourth column the page on which the elevation of the station, if one has been determined, is given; and finally in the fifth column the number of the sketch on which the station appears.

EXPLANATION OF LENGTHS

The lengths as given in the tables of positions are all reduced to sea level. If the actual length of a line is desired—that is, its length in its actual elevation on the surface of the earth—it may be obtained

by adding to the sea-level length as given in meters the following correction:

$$\text{Correction} = \frac{Sh_m}{6,370,000}$$

in which S is the length of the line in meters, and h_m is the mean elevation of the two ends of the line in meters. The correction for the length in feet can also be found by the same formula if S is taken in feet, but h_m must still be kept in meters, since the denominator is the approximate length of the radius of the earth in meters. The correction in feet may also be obtained by first obtaining it in meters using the formula as given above, and then reducing the correction thus obtained to feet by using the conversion table given on page 16.

AZIMUTH AND BACK AZIMUTH

The azimuth of a line of triangulation is its true direction reckoned clockwise from true south. The cardinal points of the compass on this system are as follows: South is 0° (or 360°), west 90° , north 180° , and east 270° .

Because of the convergence of the meridians, the azimuth and the back azimuth of a line do not differ by exactly 180° , the amount of the divergence varying with the latitude and the difference of longitude of the two ends of the line. To illustrate from the tables on page 93, the azimuth of the line Rowe to Trimmins is $280^\circ 54' 19''.75$, while the back azimuth, or azimuth from Trimmins to Rowe, is $101^\circ 07' 59''.81$.

The azimuths of the triangulation lines offer a very convenient and accurate means of testing the deflection of the magnetic needle on a surveyor's transit, and even the azimuth over such short distances as those between a station mark and its reference mark may be used for this purpose with fair accuracy provided the distance is greater than 100 feet. It is the present practice in the Coast and Geodetic Survey to establish an azimuth mark at each principal station, sufficiently near to be easily seen from the ground at the station, yet far enough away to render negligible the ordinary errors of centering instrument or target. Such marks are usually standard reference disks set in concrete. The azimuths of such marks are given to even seconds in the descriptions of stations, and will also be found, as a rule, opposite the name of the occupied station in the list of geographic positions.

In using a station for magnetic determinations, caution must be observed not to set the transit over a mark which is of such nature as would produce an appreciable deviation in the needle.

GEOGRAPHIC POSITIONS

Ninety-eighth meridian arc

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Principal points</i>	° ' "	° ' "	° ' "				
Monument (Okla.), 1902.....	34 14 23.278 97 54 53.244						
Benton (Okla.), 1902.....	34 05 35.144 97 53 14.150	171 08 33.81	351 07 38.16	Monument.....	4.2166798	16,469.48	54,033.6
Grady (Okla.), 1902.....	34 02 51.904 97 41 53.433	106 07 38.33	286 01 16.98	Benton.....	4.2592363	18,165.04	59,596.5
Blue, 1902.....	33 48 00.491 97 43 31.852	155 20 05.43 185 15 04.73	335 14 40.26 5 15 59.66	Benton..... Grady.....	4.5535169 4.4406098	35,769.83 27,580.99	117,354.8 90,488.6
Cube, 1902.....	33 55 37.369 98 07 12.485	208 35 29.90 229 21 54.71 290 58 15.89	28 42 24.17 49 29 43.62 111 11 27.49	Monument..... Benton..... Blue.....	4.5969307 4.4520804 4.5925665	39,530.35 28,319.16 39,135.11	129,692.5 92,910.4 128,395.8
Queen, 1902.....	33 37 30.209 97 52 01.172	145 04 34.94 213 59 39.24	324 56 08.30 34 04 21.93	Cube..... Blue.....	4.6115843 4.3696156	40,886.92 23,432.34	134,143.2 76,877.6
Myers, 1902.....	33 37 36.463 98 14 50.513	199 27 08.68 248 10 48.03 270 12 26.81	19 31 23.33 68 28 10.77 90 25 05.11	Cube..... Blue..... Queen.....	4.5480967 4.7164536 4.5477157	35,326.18 52,053.94 35,295.20	115,899.3 170,780.3 115,797.7
Jones, 1902.....	33 31 21.362 98 04 52.553	126 53 33.56 240 12 19.90	306 48 02.87 60 19 26.48	Myers..... Queen.....	4.2849050 4.3600449	19,271.03 22,911.05	63,225.0 75,167.3
Bowie northwest base, 1900.....	33 37 21.820 98 00 14.007	32 55 12.10 91 12 41.03 268 47 47.23	212 52 38.07 271 04 35.66 88 52 20.13	Jones..... Myers..... Queen.....	4.1214389 4.3540451 4.1039995	13,226.32 22,596.70 12,705.73	43,393.4 74,136.0 41,685.4
Bowie southeast base, 1900.....	33 33 50.056 97 57 01.613	69 22 39.76 142 45 59.36 228 46 22.13	249 18 19.54 322 44 12.91 48 49 08.37	Jones..... Bowie northwest base..... Queen.....	4.1134410 3.9136034 4.0126847	12,984.97 8,196.03 10,296.38	42,601.5 26,889.8 33,780.7
Indian, 1902.....	33 19 30.010 98 17 32.396	187 06 19.91 221 47 38.96	7 07 49.20 41 54 37.50	Myers..... Jones.....	4.5280378 4.4686631	33,731.67 29,421.72	110,668.0 96,527.8

Ninety-eighth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Spradling, 1902.....	33 23 53.808	71 47 26.53	251 38 43.27	Indian.....	4.4134238	25,907.40	84,997.9
	98 01 40.888	160 16 05.05	340 14 19.37	Jones.....	4.1658309	14,649.77	48,063.5
		185 08 25.74	5 09 13.70	Bowie northwest base.....	4.3978418	24,994.35	82,002.3
		210 42 07.74	30 47 27.80	Queen.....	4.4663589	29,265.70	96,015.9
Moore, 1902.....	33 11 07.780	132 36 56.34	312 30 59.46	Indian.....	4.3593237	22,873.03	75,042.6
	98 06 41.592	198 13 26.10	18 16 11.16	Spradling.....	4.3953043	24,848.74	81,524.6
Woolly, 1902.....	33 03 48.517	183 27 11.68	3 27 48.73	Indian.....	4.4632552	29,057.30	95,332.2
	98 18 40.066	233 56 42.89	54 03 15.51	Moore.....	4.3621447	23,022.09	75,531.6
Davis, 1902.....	33 03 49.989	89 59 34.54	269 49 32.21	Woolly.....	4.4569701	28,639.81	93,962.4
	98 00 16.036	143 29 15.67	323 25 44.98	Moore.....	4.2246628	16,786.60	55,074.0
		176 36 58.46	306 36 11.96	Spradling.....	4.5699711	37,151.05	121,886.4
Kyle, 1902.....	32 49 18.039	181 44 52.63	1 45 09.78	Woolly.....	4.4285895	26,828.07	88,018.4
	98 19 11.612	227 35 36.97	47 45 54.50	Davis.....	4.6009245	39,895.55	130,890.6
Gilbert, 1902.....	32 48 11.103	93 04 28.89	272 50 38.05	Kyle.....	4.6014032	39,939.55	131,035.0
	97 53 38.384	126 37 20.61	306 23 44.20	Woolly.....	4.6860778	48,537.54	159,243.6
		160 22 27.05	340 18 50.86	Davis.....	4.4873147	30,712.47	100,762.5
Oaks, 1902.....	32 41 33.665	126 57 24.43	306 50 48.43	Kyle.....	4.3770100	23,823.74	78,161.7
	98 06 59.743	239 31 59.84	59 39 13.33	Gilbert.....	4.3836207	24,189.16	79,360.6
McClenny, 1902.....	32 27 09.062	163 48 13.54	343 44 06.96	Kyle.....	4.6297880	42,637.14	139,885.3
	98 11 34.413	195 02 10.25	15 04 38.12	Oaks.....	4.4405914	27,579.82	90,484.8
Comanche (U.S.G.S.), 1902.....	32 22 38.716	102 53 26.46	282 40 53.68	McClenny.....	4.5755045	37,627.43	123,449.3
	97 48 10.098	139 56 49.64	319 46 42.09	Oaks.....	4.6601968	45,729.54	150,031.0
		169 44 39.84	349 41 43.01	Gilbert.....	4.6810011	47,973.47	157,393.0
Pilot, 1902.....	32 15 38.129	166 32 35.77	346 30 51.42	McClenny.....	4.3401398	21,884.66	71,799.9
	98 08 19.428	247 38 20.22	67 49 06.77	Comanche (U.S.G.S.).....	4.5338093	34,182.93	112,148.5
Gatlin, 1902.....	32 19 50.559	203 14 22.38	23 16 21.36	McClenny.....	4.1673653	14,701.62	48,233.6
	98 15 16.509	305 26 23.35	125 30 06.19	Pilot.....	4.1270816	13,399.28	43,960.8

Young, 1902.....	32 11 27.581	197 16 12.28	17 17 50.60	Gatlin.....	4.2101974	16,225.47	53,233.1
	98 18 20.685	243 50 29.39	63 55 50.02	Pilot.....	4.2438606	17,533.18	57,523.4
Alarm, 1902.....	32 11 02.160	96 10 09.26	276 07 41.45	Young.....	3.8639386	7,310.36	23,984.1
	98 13 43.217	171 28 27.47	351 27 37.68	Gatlin.....	4.2163768	16,457.99	53,995.9
		224 54 07.45	44 57 00.10	Pilot.....	4.0793936	12,005.87	39,389.3
Lone Mountain, 1902.....	32 09 51.066	96 03 04.70	275 53 26.93	Young.....	4.4560285	28,577.78	93,758.9
	98 00 15.762	130 11 59.85	310 07 42.03	Pilot.....	4.2194404	16,574.50	54,378.2
		151 00 28.29	330 54 25.57	McClenny.....	4.5631394	36,571.22	119,984.1
		218 43 01.42	38 49 28.87	Comanche (U.S.G.S.).....	4.4818414	30,327.83	99,500.6
Stephenville north base, 1900.....	32 11 41.775	83 29 44.91	263 26 08.26	Alarm.....	4.0303050	10,722.72	35,179.5
	98 06 56.527	88 39 10.94	268 33 06.44	Young.....	4.2534798	17,925.85	58,811.7
		163 24 13.44	343 23 29.24	Pilot.....	3.8806348	7,596.87	24,924.1
		287 57 50.69	108 01 24.13	Lone Mountain.....	4.0429256	11,038.90	36,216.8
Stephenville south base, 1900.....	32 08 18.709	108 05 19.26	287 59 16.30	Young.....	4.2738669	18,787.41	61,638.4
	98 06 58.895	115 26 51.32	295 23 16.10	Alarm.....	4.0692875	11,729.72	38,483.3
		180 34 05.04	0 34 06.30	Stephenville north base.....	3.7962336	6,255.090	20,521.91
		254 53 57.11	74 57 31.64	Lone Mountain.....	4.0390401	10,940.57	35,894.2
Gibson, 1902.....	31 56 36.676	160 28 52.98	340 25 35.79	Young.....	4.4641762	29,118.98	95,534.5
	98 12 09.265	189 42 33.06	9 44 35.21	Pilot.....	4.5523159	35,671.05	117,030.8
		196 22 22.03	16 25 08.08	Stephenville north base.....	4.4632942	29,059.91	95,340.7
		200 36 47.13	20 39 31.79	Stephenville south base.....	4.3637228	23,105.89	75,806.6
		217 21 45.39	37 28 04.06	Lone Mountain.....	4.4886410	30,806.40	101,070.7
Gleason, 1902.....	31 52 21.300	107 55 06.12	287 46 54.77	Gibson.....	4.4092656	25,660.53	84,187.9
	97 56 39.657	136 03 34.03	315 52 03.98	Young.....	4.6911872	49,111.95	161,128.1
		170 04 02.87	350 02 08.30	Lone Mountain.....	4.5162366	32,827.41	107,701.3
Chamliiss, 1902.....	31 39 23.415	166 57 27.93	346 55 00.02	Gibson.....	4.5141454	32,669.72	107,183.9
	98 07 28.565	215 25 53.97	35 31 35.58	Gleason.....	4.4686628	29,421.36	96,526.6
Scoggins, 1902.....	31 40 56.468	83 01 02.33	262 53 20.25	Chamliiss.....	4.3684914	23,361.00	76,643.5
	97 52 48.442	133 34 11.64	313 23 59.72	Gibson.....	4.6240812	42,080.53	138,059.2
		163 55 40.42	343 53 38.66	Gleason.....	4.3414842	21,952.51	72,022.5
Brown, 1902.....	31 26 18.848	178 51 11.41	358 51 01.81	Chamliiss.....	4.3832493	24,168.48	79,292.8
	98 07 10.205	219 59 44.23	40 07 15.28	Scoggins.....	4.5479556	35,314.71	115,861.7
King, 1902.....	31 23 35.296	103 15 07.43	283 08 03.40	Brown.....	4.3437957	22,069.66	72,406.9
	97 53 36.719	143 07 57.09	323 00 42.14	Chamliiss.....	4.5626326	36,528.56	119,844.1
		182 16 14.83	2 16 40.08	Scoggins.....	4.5063959	32,091.93	105,288.3
Franklin, 1902.....	31 14 48.813	163 13 14.95	343 11 08.72	Brown.....	4.3463243	22,198.54	72,829.7
	98 03 07.532	222 54 23.86	42 59 20.58	King.....	4.3454045	22,151.57	72,675.6
Gilmore, 1902.....	31 06 56.474	142 07 09.96	322 03 28.45	Franklin.....	4.2657044	18,437.60	60,490.7
	97 55 59.693	187 00 02.25	7 01 16.43	King.....	4.4912595	30,992.71	101,681.9

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Flat Top, 1902.....	31 08 39.509	200 42 41.26	20 46 43.93	Brown.....	4.5426607	34,886.77	114,457.7
	98 14 57.426	238 46 08.37	58 52 16.07	Franklin.....	4.3417901	21,967.98	72,073.3
		275 55 39.96	96 05 28.15	Gilmore.....	4.4815721	30,309.03	99,438.9
Bachelor, 1902.....	30 59 40.022	138 55 40.26	318 50 58.00	Flat Top.....	4.3434351	22,051.35	72,346.8
	98 05 50.495	188 45 31.18	8 48 55.41	Franklin.....	4.4520746	28,318.78	92,909.2
		229 19 35.21	49 24 39.98	Gilmore.....	4.3147275	20,640.85	67,719.2
Lampasas northeast base, 1900.....	31 03 41.449	130 23 43.40	310 20 12.91	Flat Top.....	4.1514520	14,172.68	46,498.2
	98 08 09.952	252 42 30.01	72 48 47.09	Gilmore.....	4.3067664	20,265.93	66,489.1
		333 32 28.80	153 33 40.69	Bachelor.....	3.9192962	8,304.17	27,244.6
Lampasas southwest base, 1900.....	31 01 02.945	152 19 26.32	332 17 02.57	Flat Top.....	4.2008494	15,879.96	52,099.5
	98 10 18.984	204 10 08.06	24 13 51.14	Franklin.....	4.4453616	27,884.42	91,484.1
		215 01 14.91	35 02 21.44	Lampasas northeast base.....	3.7753315	5,961.170	19,557.61
		244 23 39.58	64 31 03.00	Gilmore.....	4.4022388	25,248.69	82,836.7
		289 42 20.39	109 44 38.69	Bachelor.....	3.8788896	7,566.41	24,824.1
May, 1902.....	30 51 55.445	176 40 33.85	356 39 58.93	Flat Top.....	4.4909895	30,973.44	101,618.7
	98 13 49.631	198 19 58.25	18 21 46.56	Lampasas southwest base.....	4.2495336	17,763.71	58,279.8
		221 36 23.64	41 40 29.91	Bachelor.....	4.2820373	19,144.20	62,808.9
Gabriel, 1902.....	30 45 41.729	110 01 40.75	289 51 29.52	May.....	4.5281572	33,740.95	110,698.4
	97 53 56.389	143 44 34.37	323 38 27.88	Bachelor.....	4.5056296	32,035.36	105,102.7
		175 14 32.65	355 13 29.25	Gilmore.....	4.5954178	39,392.88	129,241.5
Buzzard, 1903.....	30 38 55.827	150 08 11.16	330 03 45.70	May.....	4.4423943	27,694.55	90,861.2
	98 05 10.557	235 05 08.66	55 10 52.90	Gabriel.....	4.3397537	21,865.21	71,736.1
Post, 1903.....	30 45 06.321	185 58 09.01	5 58 34.40	May.....	4.1027008	12,667.79	41,560.9
	98 14 39.218	306 58 22.16	127 03 12.49	Buzzard.....	4.2776597	18,952.20	62,179.0
Travis, 1903.....	30 30 58.906	149 02 49.61	329 00 01.27	Buzzard.....	4.2337392	17,129.28	56,198.3
	97 59 39.674	198 33 39.73	18 36 34.68	Gabriel.....	4.4576042	28,681.66	94,099.7
Shovel, 1903.....	30 26 30.627	180 39 13.26	00 39 20.77	Post.....	4.5360406	34,359.01	112,726.2
	98 14 53.956	214 04 55.44	34 09 51.95	Buzzard.....	4.4427936	27,720.03	90,944.8
		251 13 15.56	71 20 59.31	Travis.....	4.4107365	25,747.59	84,473.6
Shingle, 1903.....	30 18 13.305	136 20 17.56	316 15 40.44	Shovel.....	4.3259731	21,182.30	69,495.6
	98 05 45.877	202 29 36.61	229 32 41.98	Travis.....	4.4069020	25,521.25	83,731.0
Barton, 1903.....	30 18 17.887	89 44 12.14	269 36 26.67	Shingle.....	4.3917926	24,648.62	80,868.0
	97 50 23.418	111 13 50.74	291 01 27.18	Shovel.....	4.6242302	42,094.97	138,106.6
		147 40 55.30	327 36 13.73	Travis.....	4.4431325	27,741.66	91,015.8
Cedar, 1903.....	30 11 22.715	132 51 32.42	312 47 15.39	Shingle.....	4.2695090	18,599.83	61,022.9
	97 57 15.620	220 44 01.96	40 47 29.60	Barton.....	4.2273343	16,878.52	55,375.6
Loneman, 1903.....	30 04 36.278	178 18 19.01	358 18 05.00	Shingle.....	4.4008666	25,169.03	82,575.4
	98 05 18.021	225 51 40.57	45 55 42.74	Cedar.....	4.2548343	17,981.85	58,995.5
Carpenter, 1903.....	30 05 38.445	84 17 58.40	264 12 02.53	Loneman.....	4.2811890	19,106.85	62,686.4
	97 53 28.117	150 08 36.09	330 06 41.85	Cedar.....	4.0872480	12,224.97	40,108.1
		191 54 58.74	11 56 31.64	Barton.....	4.3784164	23,901.02	78,415.3
Hugo, 1903.....	29 56 24.002	199 10 38.39	19 12 16.85	Loneman.....	4.2054675	16,049.72	52,656.5
	98 08 34.879	234 50 45.70	54 58 19.32	Carpenter.....	4.4727104	29,696.85	97,430.4
Krueger, 1903.....	29 57 43.434	81 32 20.04	261 27 15.47	Hugo.....	4.2185460	16,540.40	54,266.3
	97 58 24.836	138 58 22.57	318 54 55.86	Loneman.....	4.2268020	16,857.84	55,307.8
		208 30 24.99	28 32 53.48	Carpenter.....	4.2213478	16,647.45	54,617.5
Gus, 1903.....	29 48 46.779	161 29 55.32	341 28 27.81	Hugo.....	4.1716245	14,846.51	48,708.9
	98 05 39.209	215 10 02.75	35 13 39.19	Krueger.....	4.3058023	20,220.99	66,341.7
Bear, 1903.....	29 47 07.001	201 52 59.44	21 55 07.35	Hugo.....	4.2668053	18,484.40	60,644.2
	98 12 51.770	255 09 24.88	75 12 59.85	Gus.....	4.0797697	12,016.27	39,423.4
Tieken, 1903.....	29 43 04.317	138 37 13.31	318 34 21.51	Gus.....	4.1479209	14,057.92	46,121.7
	97 59 53.134	184 59 54.92	5 00 38.86	Krueger.....	4.4341219	27,172.02	89,146.9
Mission (Mission Hill (U.S.G.S.)), 1903.....	29 42 52.843	148 20 35.47	328 19 06.32	Bear.....	3.9635368	9,194.68	30,166.2
	98 09 52.109	211 55 28.16	31 57 33.71	Gus.....	4.1086406	12,842.23	42,133.2
		268 42 05.90	88 47 02.81	Tieken.....	4.2069130	16,103.23	52,832.0
Seguin west base, 1899.....	29 39 16.318	122 51 52.27	302 48 42.01	Mission.....	4.0897003	12,294.20	40,335.2
	98 03 27.916	133 45 30.83	313 40 51.30	Bear.....	4.3215756	20,968.90	68,795.5
		168 39 02.83	348 37 57.72	Gus.....	4.2532250	17,915.34	58,777.2
		219 25 32.92	39 27 19.29	Tieken.....	3.9855622	9,089.96	29,822.6
Seguin east base, 1899.....	29 40 38.505	68 09 02.68	248 07 06.62	Seguin west base.....	3.8321633	6,794.591	22,291.92
	97 59 33.426	104 00 28.53	283 55 22.04	Mission.....	4.2339858	17,139.01	56,230.2
		119 11 45.90	299 05 09.98	Bear.....	4.3903004	24,564.07	80,590.6
		146 50 59.15	326 47 57.68	Gus.....	4.2543488	17,971.76	58,929.5
		173 16 15.08	353 16 05.32	Tieken.....	3.6552055	4,520.70	14,831.7
Mott, 1903.....	29 35 53.672	124 47 04.60	304 44 19.40	Seguin west base.....	4.0391401	10,943.09	35,902.5
	97 57 53.738	123 47 34.86	303 41 39.41	Mission.....	4.3661276	23,234.19	76,227.5
		163 00 17.96	342 59 28.66	Seguin east base.....	3.9624001	9,170.65	30,087.4
		166 23 42.04	346 22 42.96	Tieken.....	4.1348990	13,642.66	44,759.3

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Herndon, 1903	29 32 41.608	165 19 29.47	345 17 58.81	Mission	4.2890394	19,455.37	63,829.8
	98 06 48.737	203 57 33.20	23 59 12.39	Seguin west base	4.1238575	13,300.18	43,625.7
		210 13 07.15	30 16 32.63	Tieken	4.3462441	22,194.44	72,816.3
		218 32 55.09	38 36 30.18	Seguin east base	4.2737548	18,782.56	61,622.4
		247 38 16.38	67 42 40.41	Mott	4.1922132	15,567.30	51,073.7
Central, 1903	29 31 20.972	108 23 55.77	288 21 38.98	Herndon	3.8961794	7,873.71	25,832.3
	98 02 11.241	171 58 47.96	351 58 10.10	Seguin west base	4.1696837	14,780.32	48,491.8
		193 53 04.02	13 54 21.97	Seguin east base	4.2475693	17,683.54	58,016.7
		219 31 31.38	39 33 38.42	Mott	4.0369461	10,887.95	35,721.5
Thomas, 1903	29 25 40.976	137 33 51.41	317 30 56.47	Central	4.1519578	14,189.20	46,552.4
	97 56 15.710	172 02 23.17	352 01 34.88	Mott	4.2798521	19,048.12	62,493.7
Lavernia, 1904	29 18 52.088	185 09 22.19	5 10 04.24	Herndon	4.4089810	25,643.72	84,132.8
	98 08 14.335	202 58 37.34	23 01 35.68	Central	4.3987828	25,048.56	82,180.1
		236 56 43.18	57 02 35.64	Thomas	4.3638138	23,110.74	75,822.5
Stockdale, 1904	29 14 42.682	111 11 51.90	291 05 52.25	Lavernia	4.3280483	21,283.76	69,828.5
	97 55 58.964	178 43 27.06	358 43 18.85	Thomas	4.3069105	20,272.65	66,511.2
Serita, 1904	29 11 08.584	169 44 52.80	349 44 06.06	Lavernia	4.1614293	14,502.05	47,578.8
	98 06 38.686	212 00 05.04	32 05 09.97	Thomas	4.5008793	31,686.87	103,959.3
		249 04 34.21	69 09 46.45	Stockdale	4.2670266	18,493.82	60,675.1
Ruckman, 1904	29 01 36.830	115 53 38.53	295 42 43.56	Serita	4.6068075	40,439.66	132,675.8
	97 44 12.207	141 45 06.60	321 39 22.49	Stockdale	4.4889403	30,827.64	101,140.3
Karnes, 1904	28 52 38.740	150 39 00.41	330 33 15.15	Serita	4.5934908	39,218.49	128,669.3
	97 54 47.225	177 16 44.40	357 16 09.55	Stockdale	4.6107259	40,806.18	133,878.3
		226 01 35.08	46 06 42.48	Ruckman	4.3779846	23,877.27	78,337.3
Choate, 1904	28 43 00.212	133 45 34.51	313 40 03.62	Karnes	4.4111597	25,772.69	84,555.9
	97 43 20.320	177 39 40.00	357 39 14.95	Ruckman	4.5366206	34,404.92	112,876.8
Bryde, 1904	28 44 54.898	170 34 13.26	350 33 31.08	Karnes	4.1606347	14,475.54	47,491.8
	97 53 19.707	205 38 54.41	25 43 18.91	Ruckman	4.5343759	34,227.56	112,294.9
		282 12 25.60	102 17 13.74	Choate	4.2212549	16,643.89	54,605.8
Pettus, 1904	28 39 11.761	137 14 46.98	317 11 54.05	Bryde	4.1581157	14,391.82	47,217.2
	97 47 19.623	222 42 53.02	42 44 47.88	Choate	3.9811108	9,574.38	31,411.9
Borroum, 1904	28 37 18.803	183 35 06.21	3 35 21.77	Bryde	4.1482476	14,068.49	46,156.4
	97 53 52.130	251 54 29.72	71 57 37.84	Pettus	4.1049749	11,213.60	36,790.0
Wiess, 1904	28 33 39.677	112 56 03.02	292 51 21.70	Borroum	4.2390270	17,339.12	56,886.8
	97 44 04.291	152 34 43.90	332 33 10.38	Pettus	4.0613945	11,518.46	37,790.1
		183 57 22.28	3 57 43.36	Choate	4.2379774	17,297.26	56,749.4
Fleming, 1904	28 27 32.943	184 28 19.33	4 28 44.14	Borroum	4.2574511	18,090.52	59,352.0
	97 54 44.056	236 58 37.36	57 03 42.73	Wiess	4.3167987	20,739.52	68,042.9
Beeville, 1904	28 27 22.692	91 21 45.80	271 17 47.67	Fleming	4.1335274	13,599.64	44,618.2
	97 46 24.331	146 28 10.80	326 24 36.86	Borroum	4.3428531	22,021.81	72,249.9
		198 09 28.36	18 10 35.20	Wiess	4.0868612	12,214.09	40,072.4
Miller, 1904	28 18 06.866	149 09 54.04	329 06 52.25	Fleming	4.3074961	20,300.00	66,600.9
	97 48 21.608	190 33 46.96	10 34 42.70	Beeville	4.2406934	17,405.78	57,105.5
O'Neill, 1905	28 19 56.180	71 33 17.12	251 30 21.70	Miller	4.0262042	10,621.95	34,848.8
	97 42 11.792	124 31 24.80	304 25 27.05	Fleming	4.3951731	24,841.23	81,499.9
		153 26 38.91	333 24 38.82	Beeville	4.1866386	15,368.75	50,422.3
Skelly, 1904	28 12 32.851	177 43 11.97	357 43 04.86	Miller	4.0124231	10,290.18	33,760.4
	97 48 06.583	215 17 46.81	35 20 34.85	O'Neill	4.2233819	16,725.61	54,873.9
Welder, 1904	28 10 33.647	104 16 33.12	284 12 22.69	Skelly	4.1736616	14,916.32	48,938.0
	97 39 16.494	133 13 37.87	313 09 19.96	Miller	4.3092864	20,383.86	66,876.0
		164 35 05.52	344 33 42.54	O'Neill	4.2543966	17,963.73	58,936.0
Mathis, 1904	28 05 36.585	190 47 04.54	10 47 46.77	Skelly	4.1154245	13,044.41	42,796.5
	97 49 36.088	241 33 14.41	61 38 06.58	Welder	4.2838109	19,222.54	63,065.9
Nolan, 1904	28 00 22.845	133 45 21.37	313 42 27.56	Mathis	4.1452135	13,970.55	45,835.0
	97 43 26.456	161 13 34.97	341 11 23.00	Skelly	4.3754198	23,736.67	77,876.1
		199 55 53.92	19 57 51.63	Welder	4.3010733	20,002.00	65,623.2
Elliff, 1904	27 50 06.038	174 56 14.39	354 55 30.80	Mathis	4.4587339	28,756.36	94,344.8
	97 48 03.134	201 42 26.32	21 44 35.87	Nolan	4.3104388	20,438.02	67,053.7
Reynolds, 1904	27 55 48.875	213 38 43.18	33 42 10.39	Mathis	4.3372297	21,738.50	71,320.4
	97 56 57.274	249 06 46.05	69 13 06.31	Nolan	4.3749511	23,711.07	77,792.1
		305 48 21.65	125 52 31.45	Elliff	4.2558243	18,022.88	59,130.1
Alice, 1904	27 44 33.124	210 44 44.44	30 48 15.82	Reynolds	4.3839864	24,209.53	79,427.4
	98 04 29.951	249 09 48.80	69 17 28.87	Elliff	4.4608025	28,893.66	94,795.3
Wood, 1904	27 43 41.350	96 51 09.74	276 47 23.37	Alice	4.1276767	13,417.66	44,021.1
	97 56 23.539	177 38 29.56	357 38 13.81	Reynolds	4.3505019	22,413.10	73,533.6
		229 07 50.68	49 11 43.92	Elliff	4.2578743	18,108.16	59,409.9

Ninety-eighth meridian arc—Continued

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U. S. COAST AND GEODETIC SURVEY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Alice east base, 1899.....	27 38 40.314	139 28 59.30	319 26 21.77	Alice.....	4.1550236	14,289.72	46,882.2
	97 58 50.983	203 32 56.41	23 34 04.92	Wood.....	4.0046905	10,108.59	33,164.6
Alice west base, 1899.....	27 38 39.073	167 59 27.68	347 58 48.34	Alice.....	4.0469619	11,141.97	36,554.9
	98 03 05.306	229 46 18.53	49 49 25.20	Wood.....	4.1587934	14,414.30	47,290.9
		269 40 10.98	89 42 08.98	Alice east base.....	3.8433392	6,971.71	22,873.0
King, 1913.....	27 33 06.853	133 03 45.81	313 00 40.81	Alice west base.....	4.1756123	14,983.47	49,158.3
	97 56 25.961	180 11 40.79	0 11 41.92	Wood.....	4.2907056	19,530.15	64,075.2
Bishop, 1913.....	27 34 13.665	83 01 22.59	262 56 40.76	King.....	4.2262265	16,835.52	55,234.5
	97 46 16.864	106 31 23.26	286 23 35.94	Alice west base.....	4.4599138	28,834.59	94,601.5
		136 27 23.68	316 22 42.15	Wood.....	4.3824137	24,122.02	79,140.3
Ricardo, 1913.....	27 24 08.480	179 54 49.38	359 54 48.96	King.....	4.2193469	16,570.93	54,366.5
	97 56 25.052	221 49 51.74	41 54 32.45	Bishop.....	4.3981928	25,014.56	82,068.6
Kleberg eccentric, 1913.....	27 24 29.057	87 16 00.76	267 12 20.93	Ricardo.....	4.1184490	13,135.57	43,095.6
	97 48 27.461	140 32 01.82	320 28 21.02	King.....	4.3149959	20,653.61	67,761.1
		191 15 33.46	11 16 33.74	Bishop.....	4.2635811	18,347.68	60,195.7
Riviera, 1913.....	27 17 39.420	155 29 53.32	335 28 22.04	Ricardo.....	4.1192992	13,161.31	43,180.1
	97 53 06.370	211 16 55.14	31 19 03.28	Kleberg eccentric.....	4.1689625	14,755.79	48,411.3
Robbins, 1913.....	27 18 23.190	84 43 50.71	264 39 48.62	Riviera.....	4.1636554	14,576.57	47,823.3
	97 44 18.537	118 04 12.64	297 58 38.81	Ricardo.....	4.3544913	22,619.93	74,212.2
		148 44 10.88	328 42 16.49	Kleberg eccentric.....	4.1197943	13,176.33	43,229.3
Roza, 1913.....	27 10 22.402	170 12 28.80	350 11 50.18	Riviera.....	4.1351277	13,649.84	44,782.8
	97 51 41.951	219 28 26.86	39 31 49.82	Robbins.....	4.2828097	19,178.28	62,920.7
Sarita, 1913.....	27 09 20.521	98 30 00.98	278 26 28.91	Roza.....	4.1115822	12,929.51	42,419.6
	97 43 57.442	135 30 24.64	315 26 13.52	Riviera.....	4.3332267	21,539.06	70,666.1
		178 00 39.79	358 00 30.14	Robbins.....	4.2230446	16,712.62	54,831.3
Robbins eccentric, 1931.....	27 18 22.778	357 50 30.43	177 50 40.88	Sarita.....	4.2227604	16,701.69	54,795.5
	97 44 20.286	39 26 36.32	219 23 14.16	Roza.....	4.2818947	19,137.92	62,788.3
		255 13 21.87	75 13 22.67	Robbins.....	1.6966010	49.728	163.15

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Pasadiso, 1912.....	27 15 38.122	37 40 14.40	217 37 45.43	Sarita.....	4.1666872	14,678.69	48,158.3
	97 38 31.637	117 52 49.57	297 50 09.75	Robbins eccentric.....	4.0352456	10,845.40	35,581.9
Crawford 2, 1912.....	27 14 28.697	55 52 33.80	235 48 41.63	Sarita.....	4.2277322	16,893.99	55,426.4
	97 35 29.500	113 06 28.69	293 05 05.29	Pasadiso.....	3.7361707	5,447.17	17,871.3
		116 18 02.42	296 13 59.15	Robbins eccentric.....	4.2116509	16,279.87	53,411.5
Turcotte, 1913.....	27 02 09.558	176 30 28.44	356 30 13.12	Roza.....	4.1817571	15,196.97	49,858.7
	97 51 08.327	221 47 52.28	41 51 08.54	Sarita.....	4.2504152	17,799.80	58,398.2
Kenedy, 1913.....	27 01 05.308	101 32 45.05	281 30 05.16	Turcotte.....	3.9955729	9,898.58	32,475.6
	97 45 16.462	148 15 08.77	328 12 13.19	Roza.....	4.3046715	20,168.40	66,169.2
		188 07 25.48	8 08 01.46	Sarita.....	4.1874158	15,396.28	50,512.6
Katherine, 1913.....	26 53 57.441	184 03 45.90	4 04 03.60	Turcotte.....	4.1813939	15,184.27	49,817.1
	97 51 47.358	219 17 00.12	39 19 57.33	Kenedy.....	4.2309378	17,019.15	55,837.0
Armstrong, 1913.....	26 53 56.522	90 10 18.66	270 07 17.63	Katherine.....	4.0430548	11,042.18	36,227.6
	97 45 07.220	146 44 43.80	326 42 00.04	Turcotte.....	4.2588902	18,150.57	59,549.0
		178 53 38.37	358 53 34.18	Kenedy.....	4.1205522	13,199.34	43,304.8
Vinson, 1913.....	26 45 25.133	185 47 33.13	5 47 59.29	Katherine.....	4.1999801	15,848.20	51,995.3
	97 52 45.320	218 45 38.11	38 49 04.86	Armstrong.....	4.3051834	20,192.19	66,247.2
Norias, 1913.....	26 44 29.264	98 46 58.12	278 43 56.32	Vinson.....	4.0528154	11,293.16	37,051.0
	97 46 01.389	151 22 17.01	331 19 40.92	Katherine.....	4.2994274	19,926.33	65,375.0
		184 53 37.99	4 54 02.44	Armstrong.....	4.2435912	17,522.30	57,487.7
Stillman, 1913.....	26 36 57.870	187 27 09.21	7 27 42.40	Vinson.....	4.1971356	15,744.74	51,655.9
	97 53 59.230	223 31 57.40	43 35 31.94	Norias.....	4.2826564	19,171.51	62,898.5
Yturria, 1913.....	26 36 45.693	91 30 57.72	271 27 03.39	Stillman.....	4.1606405	14,475.73	47,492.5
	97 45 16.149	142 11 13.73	322 07 52.01	Vinson.....	4.3062770	20,243.10	66,414.2
		174 59 32.04	354 59 11.72	Norias.....	4.1559927	14,321.64	46,986.9
Tarida, 1931.....	26 38 29.679	80 13 30.20	260 08 30.53	Yturria.....	4.2734749	18,770.46	61,582.8
	97 34 07.511	119 19 31.46	299 14 10.79	Norias.....	4.3546258	22,626.94	74,235.2
Ladiana, 1931.....	26 31 35.936	115 41 40.03	295 36 19.18	Yturria.....	4.3428687	22,022.60	72,252.5
	97 33 18.821	173 57 45.91	353 57 24.12	Tarida.....	4.1073560	12,804.30	42,008.8
Portalis 2, 1913.....	26 38 34.940	39 38 01.17	219 35 08.59	Ladiana.....	4.2237068	16,738.12	54,915.0
	97 26 53.177	89 15 17.16	269 12 02.40	Tarida.....	4.0796841	12,013.90	39,415.6
Sautz, 1913.....	26 32 16.327	84 45 12.06	264 41 34.90	Ladiana.....	4.1308565	13,516.26	44,344.6
	97 25 12.664	166 34 53.36	346 34 08.37	Portalis 2.....	4.0784357	11,979.42	39,302.5
Brenner, 1913.....	26 28 48.199	167 22 07.81	347 21 13.26	Stillman.....	4.1887631	15,444.12	50,669.6
	97 51 57.151	217 02 28.23	37 05 27.45	Yturria.....	4.2652026	18,416.31	60,420.8

TRIANGULATION IN TEXAS

27

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Principal points—Continued								
Raymond, 1913.....	26 28 55.913 97 44 20.015	88 57 14.60 132 48 31.36 173 52 09.15	268 53 50.76 312 44 12.47 353 51 44.06	Brenner..... Stillman..... Yturria.....	4.1025498 4.3392846 4.1625936	12,663.38 21,841.61 14,540.98	41,546.4 71,658.7 47,706.5	
Hidalgo, 1913.....	26 19 59.528 97 51 41.927	178 30 55.42 216 32 44.56	358 30 48.65 36 36 01.10	Brenner..... Raymond.....	4.2115278 4.3129046	16,275.25 20,554.39	53,396.4 67,435.5	
Sebastian, 1913.....	26 20 00.520 97 46 12.317	89 49 44.35 149 32 39.26 190 41 23.71	269 47 18.14 329 30 05.90 10 42 13.66	Hidalgo..... Brenner..... Raymond.....	3.9609837 4.2751434 4.2244827	9,140.79 18,842.71 16,768.05	29,989.4 61,819.8 55,013.2	
Mercedes, 1913.....	26 12 23.154 97 51 59.094	181 56 29.19 214 20 09.56	01 56 36.79 34 22 43.04	Hidalgo..... Sebastian.....	4.1477595 4.2317175	14,052.69 17,049.73	46,104.5 55,937.3	
Harlingen, 1913.....	26 11 07.041 97 45 13.568	101 46 36.05 146 41 34.90 174 19 57.59	281 43 37.04 326 38 43.08 354 19 31.60	Mercedes..... Hidalgo..... Sebastian.....	4.0607115 4.2925448 4.2174365	11,500.36 19,613.04 16,498.20	37,730.8 64,347.1 54,127.8	
Maria, 1913.....	26 05 07.839 97 51 56.760	179 43 22.39 225 21 07.12	359 43 21.36 45 24 04.72	Mercedes..... Harlingen.....	4.1269900 4.1969076	13,396.46 15,736.48	43,951.6 51,628.8	
Mitla, 1913.....	26 05 22.763 97 44 58.869	87 45 38.84 137 58 04.76 177 47 38.02	267 42 35.08 317 54 59.57 357 47 31.54	Maria..... Mercedes..... Harlingen.....	4.0652955 4.2411551 4.0254113	11,622.39 17,424.29 10,602.57	38,131.1 57,166.2 34,785.3	
Donna, 1913.....	26 09 40.593 98 02 44.471	254 21 46.81 294 58 01.95	74 26 31.58 115 02 47.14	Mercedes..... Maria.....	4.2696464 4.2978913	18,605.72 19,855.98	61,042.3 65,144.2	
Rio, 1913.....	26 04 24.942 97 56 43.807	134 07 53.96 208 14 12.01 260 35 12.32	314 05 15.19 28 16 17.44 80 37 18.51	Donna..... Mercedes..... Maria.....	4.1447561 4.2228957 3.9077425	13,955.84 16,706.89 8,086.16	45,786.8 54,812.5 26,529.3	
Tenacitas (Mexico), 1911.....	25 59 21.658 98 02 18.919	177 51 58.53 224 55 52.80	357 51 47.30 44 58 19.87	Donna..... Rio.....	4.2801228 4.1201721	19,060.00 13,187.79	62,532.7 43,266.9	
Colombres (Mexico), 1911.....	25 59 18.968 98 06 13.534	196 52 59.69 239 14 14.83 269 15 32.23	16 54 31.58 59 18 24.86 89 17 15.04	Donna..... Rio..... Tenacitas.....	4.3008679 4.2654698 3.8146461	19,992.54 18,427.64 6,525.99	65,592.2 60,458.0 21,410.7	

Supplementary points

T. 4 S., R. 7 W., sec. 2, northeast corner (Okla.), 1902. ¹	34 14 43.83 97 54 43.60	21 17 10	201 17 05	Monument.....	2.832298	679.67	2,229.9
T. 5 S., R. 7 W., sec. 25, center (Okla.), 1902. ¹	34 05 34.30 97 53 09.42	102 07 46	282 07 43	Benton.....	2.093176	123.93	406.6
Section corner near station Grady (Okla.), 1902. ¹	34 02 31.36 97 42 00.74	196 29 06	16 29 10	Grady.....	2.819544	660.00	2,165.3
House east of station Grady, north gable (Okla.), 1902.	34 00 30.971 97 37 53.041	111 42 36.4 196 47 18.5	291 34 00.7 16 50 05.1	Benton..... Lone Tree.....	4.405095 4.420093	25,415.3 26,308.3	83,383 86,313
Nocona Baptist Church, cupola, 1902.....	33 47 33.155 97 43 39.517	185 29 25.5 193 10 29.4	5 30 24.7 13 10 33.6	Grady..... Blue.....	4.453898 2.937014	28,437.9 865.0	93,300 2,838
Nocona schoolhouse, cupola, 1902.....	33 47 29.340 97 43 34.502	35 17 32.1 184 03 49.1	215 12 50.9 4 03 50.6	Queen..... Blue.....	4.354190 2.983282	22,604.2 962.2	74,161 3,157
Ringgold Presbyterian Church, spire, 1902 ¹	33 49 11.62 97 56 33.42	125 56 22 276 09 40	305 50 26 96 16 55	Cube..... Blue.....	4.306931 4.305805	20,273.6 20,221.1	66,514 66,342
Henrietta, Clay County, courthouse, dome, 1902.	33 48 57.424 98 11 43.881	209 29 30.3 12 54 52.1	29 32 01.6 192 53 08.6	Cube..... Myers.....	4.151054 4.332909	14,159.7 21,523.3	46,456 70,614
Henrietta schoolhouse, 1902.....	33 48 47.693 98 11 29.268	207 35 02.5 14 04 53.1	27 37 25.6 194 03 01.4	Cube..... Myers.....	4.153617 4.328776	14,243.5 21,319.5	46,731 69,946
Henrietta standpipe, 1902.....	33 49 12.717 98 11 40.032	210 06 07.2 12 53 31.7	30 08 36.3 192 51 46.0	Cube..... Myers.....	4.136772 4.342515	13,701.6 22,004.7	44,953 72,194
House, 5 miles southeast of Henrietta, south-east gable, 1902. ¹	33 45 51.31 98 07 58.66	34 51 32 183 45 30	214 47 44 3 45 55	Myers..... Cube.....	4.268871 4.257575	18,572.5 18,095.7	60,933 59,369
House on ridge, north chimney, 1902 ¹	33 42 05.84 97 59 40.33	70 34 50 155 05 31	250 26 25 335 01 20	Myers..... Cube.....	4.395761 4.440520	24,874.9 27,575.3	81,610 90,470
Bellevue, Webb's house, cupola, 1902.....	33 37 48.021 98 01 29.339	292 34 04.9 23 45 45.0	112 34 46.6 203 43 52.7	Bowie northwest base..... Queen.....	3.322793 4.114422	2,102.8 13,014.3	6,899 42,698
Bellevue Methodist Episcopal Church, east gable, 1902. ¹	33 38 04.11 98 00 49.42	274 20 46 324 58 51	94 25 38 144 59 11	Queen..... Bowie northwest base.....	4.135295 3.201641	13,655.1 1,590.9	44,800 5,219
Bellevue, Orton's windmill, 1902.....	33 37 24.228 98 00 05.076	269 06 58.6 33 34 28.4	89 11 26.6 213 31 49.4	Queen..... Jones.....	4.096013 4.127577	12,474.2 13,414.6	40,926 44,011
Bowdecker's windmill tower, 1902 ¹	33 34 29.54 97 57 23.02	335 35 01 140 18 04	155 35 13 320 16 29	Bowie southeast base..... Bowie northwest base.....	3.125741 3.838840	1,335.8 6,899.9	4,383 22,687

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Jim Ned (U.S.G.S.), 1902.....	33 36 46.096	93 37 18.2	273 29 28.5	Queen.....	4.3406170	21,908.7	71,879
	97 37 52.877	157 14 18.0	337 11 09.9	Blue.....	4.3528919	22,536.8	73,939
Bowie standpipe (U.S.G.S.), 1902.....	33 33 57.713	41 27 17.99	221 21 27.42	Spradling.....	4.3945525	24,905.76	81,383.6
	97 51 05.417	77 20 35.76	257 12 58.70	Jones.....	4.3399755	21,876.38	71,772.8
		88 33 22.87	268 30 05.93	Bowie southeast base.....	3.9633355	9,190.42	30,152.2
		114 00 36.10	293 55 32.56	Bowie northwest base.....	4.1897654	15,479.80	50,786.6
		167 37 09.85	347 36 39.00	Queen.....	3.8262515	6,702.73	21,990.5
Bowie National Hotel, cupola, 1902.....	33 33 37.952	92 17 47.5	272 14 25.7	Bowie southeast base.....	3.974072	9,420.5	30,907
	97 50 56.679	166 55 18.2	346 54 42.5	Queen.....	3.866066	7,346.3	24,102
Bowie Methodist Church, spire, 1902.....	33 33 40.725	91 45 43.4	271 42 19.8	Bowie southeast base.....	3.977810	9,501.9	31,174
	97 50 53.403	166 07 21.9	346 06 44.4	Queen.....	3.862304	7,282.9	23,894
Young's (J. B.) house, north chimney, 1902 ¹	33 32 49.43	130 28 22	310 24 40	Myers.....	4.134586	13,632.8	44,727
	98 06 06.16	298 14 47	118 16 35	Jones.....	3.758150	5,729.9	18,799
House, northwest of station Jones, center chimney, 1902.....	33 33 41.972	269 03 38.3	89 09 21.2	Bowie southeast base.....	4.204189	16,002.5	52,502
	98 07 21.942	318 19 43.8	138 21 06.2	Jones.....	3.763306	5,798.4	19,024
Bowie northwest base latitude station, 1906 ¹	33 27 21.76						
	98 00 13.96						
Chico, church with open spire, 1902.....	33 22 10.734	15 29 17.2	195 25 58.8	Davis.....	4.546341	35,183.7	115,432
	97 54 13.855	43 30 38.6	223 23 48.3	Moore.....	4.449240	28,134.6	92,305
Chico, church with square-top spire, 1902.....	33 22 07.252	44 16 19.2	224 09 20.1	Moore.....	4.452484	28,345.5	92,997
	97 53 57.774	105 22 18.5	285 18 03.7	Spradling.....	4.093844	12,412.1	40,722
Jacksboro courthouse, statue, 1902.....	33 13 07.248	211 12 57.4	31 17 14.0	Spradling.....	4.367349	23,299.6	76,442
	98 09 28.155	310 27 20.6	130 28 51.8	Moore.....	3.753635	5,670.7	18,605
Jacksboro jail, cupola, 1902 ¹	33 13 02.70	210 50 50	30 55 05	Spradling.....	4.368706	23,372.5	76,681
	98 09 24.63	309 57 52	129 59 22	Moore.....	3.741197	5,510.6	18,079
Old chimney, northwest of Joplin, 1902 ¹	33 06 45.07	339 35 38	159 36 49	Davis.....	3.986701	9,698.4	31,819
	98 02 26.39	123 38 16	303 35 56	Moore.....	3.899855	7,940.6	26,052
Agnes, highest windmill, 1902 ¹	32 58 56.69	26 33 58	206 30 30	Gilbert.....	4.346927	22,229.4	72,931
	97 47 16.27	114 07 07	294 00 02	Davis.....	4.345624	22,162.8	72,712
Agnes schoolhouse, cupola, 1902 ¹	32 58 41.71	27 15 22	207 11 53	Gilbert.....	4.339386	21,846.7	71,675
	97 47 13.83	115 07 45	295 00 39	Davis.....	4.350492	22,412.6	73,532
Weatherford, tank near white house, 1902 ¹	32 45 29.36	358 44 21	178 44 40	Comanche.....	4.625632	42,231.1	138,553
	97 48 45.65	123 12 27	303 09 49	Gilbert.....	3.959176	9,102.8	29,865
Weatherford, white house with red roof, cupola, 1902. ¹	32 45 30.16	358 47 44	178 48 03	Comanche.....	4.625875	42,254.7	138,631
	97 48 44.07	122 56 17	302 53 38	Gilbert.....	3.960173	9,123.7	29,933
Weatherford, yellow house with dark roof, cupola, 1902. ¹	32 44 18.71	00 57 05	180 56 51	Comanche.....	4.602603	40,050.0	131,397
	97 47 44.66	127 53 44	307 50 32	Gilbert.....	4.066777	11,662.1	38,261
Lingleville schoolhouse, cupola, 1902.....	32 14 26.458	229 11 52.1	49 14 48.3	Gatlin.....	4.184190	15,282.3	50,139
	98 22 38.711	309 10 32.6	129 12 50.2	Young.....	3.940447	8,718.6	28,604
Lingleville, open belfry, 1902 ¹	32 14 33.18	229 37 33	49 41 28	Gatlin.....	4.179028	15,101.8	49,546
	98 22 36.40	310 28 07	130 30 24	Young.....	3.944716	8,804.7	28,887
Stephenville, courthouse, tower, center, 1902.....	32 13 12.034	288 50 40.9	108 53 26.5	Stephenville north base.....	3.934347	8,597.0	28,205
	98 12 07.152	32 10 30.5	212 09 39.4	Alarm.....	3.674477	4,725.8	15,505
Stephenville oil mill, stack, 1902 ¹	32 13 18.81	24 23 55	204 23 17	Alarm.....	3.664793	4,621.6	15,163
	98 12 30.34	160 11 40	340 10 11	Gatlin.....	4.108106	12,826.4	42,081
Stephenville, Tarleton College, dome center, 1902.....	32 13 01.660	284 45 36.4	104 48 46.1	Stephenville north base.....	3.984130	9,641.2	31,631
	98 12 52.463	19 51 39.2	199 51 12.2	Alarm.....	3.592565	3,913.5	12,840
Long house, north center chimney, 1902.....	32 12 18.469	306 58 48.1	126 59 51.6	Alarm.....	3.591805	3,906.7	12,817
	98 15 42.350	69 18 25.1	249 17 00.7	Young.....	3.646744	4,433.5	14,546
Johnsville cotton gin, stack, 1902 ¹	32 08 44.09	140 04 51	320 01 14	Pilot.....	4.221038	16,635.6	54,579
	98 01 31.58	223 55 01	43 55 42	Lone Mountain.....	3.456963	2,863.9	9,396
Skippers Gap windmill, 1902.....	32 08 46.520	116 25 26.9	296 21 45.9	Stephenville north base.....	4.084339	12,143.4	39,840
	98 00 01.352	134 13 13.2	214 08 47.8	Pilot.....	4.259854	18,190.9	59,681
Dublin standpipe, 1902.....	32 05 29.630	199 53 14.3	19 54 35.3	Young.....	4.069131	11,725.5	38,469
	98 20 52.959	242 20 58.2	62 27 23.2	Stephenville north base.....	4.393348	24,737.1	81,158
Dublin High School, cupola, 1902.....	32 05 19.067	195 05 09.5	15 06 11.6	Young.....	4.070276	11,756.4	38,571
	98 20 17.498	255 08 13.0	75 15 17.5	Stephenville south base.....	4.335563	21,655.2	71,047
Dublin church, tall spire, 1902.....	32 05 17.617	255 11 25.6	75 18 35.2	Stephenville south base.....	4.340613	21,908.5	71,878
	98 20 27.038	320 48 43.7	140 53 07.5	Gibson.....	4.315780	20,690.9	67,883
Dublin oil mill, center, 1902 ¹	32 05 14.07	194 39 54	14 40 56	Young.....	4.075279	11,892.7	39,018
	98 20 15.63	223 46 49	43 50 18	Alarm.....	4.171940	14,857.3	48,744

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Purves schoolhouse, cupola, 1902.....	32 00 18.186 98 16 15.609	224 34 15.9 316 30 38.1	44 39 11.5 136 32 48.5	Stephenville south base..... Gibson.....	4.317877 3.973188	20,791.1 9,401.3	68,212 30,844
Purves cotton gin, stack, 1902.....	32 00 10.662 98 16 14.871	224 05 18.4 315 36 25.7	44 10 13.6 135 38 35.7	Stephenville south base..... Gibson.....	4.321045 3.964777	20,943.3 9,221.0	68,711 30,252
Carlton cotton gin, stack, 1902.....	31 55 15.852 98 10 14.388	129 31 46.6 191 59 44.5	309 30 45.8 12 01 28.2	Gibson..... Stephenville south base.....	3.592389 4.391860	3,911.9 24,652.4	12,834 80,880
Olin cotton gin, stack, 1902 ¹	31 57 26.20 98 05 59.92	302 29 46 4 00 21	122 34 42 183 59 34	Gleason..... Chamliiss.....	4.242051 4.524150	17,460.3 33,431.0	57,284 109,682
Evans (U.S.G.S.), 1902 ¹	31 52 21.20 97 56 39.89	63 15 32	243 15 32	Gleason.....	0.84217	6,953	22.81
White church spire, southeast of Chamliiss, 1902. ¹	31 37 16.06 98 03 20.26	16 42 00 120 57 32	196 40 00 300 55 22	Brown..... Chamliiss.....	4.324916 3.882447	21,130.8 7,628.6	69,327 25,028
Copperas Cove, church, spire, 1902 ¹	31 07 20.93 97 53 56.31	77 02 04 133 25 17	257 01 00 313 20 32	Gilmore..... Franklin.....	3.525671 4.302804	3,354.8 20,081.9	11,007 65,885
Copperas Cove schoolhouse, cupola, 1902 ¹	31 07 17.06 97 53 56.27	79 02 16 133 39 56	259 01 12 313 35 11	Gilmore..... Franklin.....	3.522584 4.304592	3,331.1 20,164.7	10,929 66,157
Waters Mountain (U.S.G.S.), 1902.....	31 05 31.616 98 20 36.202	237 10 07.2 294 41 12.9	57 13 02.3 114 48 49.7	Flat Top..... Bachelor.....	4.028567 4.442670	10,679.9 25,862.5	35,039 84,851
Lampasas courthouse, dome, 1902 ¹	31 03 55.45 98 10 38.81	354 20 45 141 56 36	174 20 55 321 54 22	Lampasas southwest base..... Flat Top.....	3.727403 4.045832	5,338.3 11,113.0	17,514 36,460
Lampasas spring house, cupola, 1902 ¹	31 04 03.72 98 10 32.80	140 28 27 280 15 20	320 26 10 100 16 33	Flat Top..... Lampasas northeast base.....	4.041950 3.585333	11,014.1 3,848.9	36,135 12,628
Lampasas schoolhouse, cupola, 1902 ¹	31 04 06.58 98 10 51.14	351 25 18 142 11 22	171 25 35 322 09 15	Lampasas southwest base..... Flat Top.....	3.757333 4.027006	5,791.2 10,641.6	18,764 34,913
Lampasas First Baptist Church, spire, 1902.....	31 03 51.278 98 10 56.161	313 38 38.5 349 13 47.1	133 44 16.1 169 14 06.3	Bachelor..... Lampasas southwest base.....	4.049478 3.722380	11,206.7 5,276.9	36,767 17,313

Bachelor latitude station, 1906 ¹	30 59 40.02 98 05 52.49						
Bertram, railroad windmill, 1903 ¹	30 44 32.14 98 03 13.48	261 43 50 16 45 10	81 48 35 196 44 11	Gabriel..... Buzzard.....	4.175268 4.034030	14,971.6 10,815.1	49,119 35,483
Bertram Methodist Church, spire, 1903 ¹	30 44 27.40 98 03 26.20	261 22 19 15 13 23	81 27 10 195 12 30	Gabriel..... Buzzard.....	4.185481 4.024557	15,327.8 10,581.7	50,288 34,717
Shovel Mountain (U.S.G.S.), 1903.....	30 26 30.630 98 14 53.724	316 16 14.8 89 25 40.8	136 20 51.7 269 25 40.6	Shingle Hill (U.S.G.S.) Shovel.....	4.325774 0.771875	21,172.6 5,914	69,464 19.40
Shingle Hill (U.S.G.S.), 1903.....	30 18 13.456 98 05 45.991	326 48 48.5 136 20 07.7	146 48 48.6 316 15 20.6	Shingle..... Shovel.....	0.744130 4.325861	5,548 21,176.8	18.20 69,478
Austin, capitol dome, star in hand of Liberty, 1903.....	30 16 28.069 97 44 24.180	36 04 21.66 65 32 59.28 109 25 45.11	215 59 48.18 245 26 30.86 289 22 43.92	Carpenter..... Cedar..... Barton.....	4.3933346 4.3554501 4.0076818	24,736.29 22,669.93 10,178.45	81,155.6 74,376.3 33,398.8
Austin Colored Asylum, standpipe, 1903 ¹	30 18 32.13 97 44 12.45	57 46 55 87 29 34	237 40 20 267 26 27	Cedar..... Barton.....	4.393815 3.996587	24,763.7 9,921.7	81,246 32,561
Austin Colored Asylum, dome at south end, 1903 ¹	30 18 26.25 97 44 12.56	58 08 02 88 32 13	238 01 27 268 29 06	Cedar..... Barton.....	4.392084 3.996183	24,665.2 9,912.5	80,922 32,521
Austin latitude station, 1872 ¹	30 16 22.45 97 44 19.16						
Austin north meridian, 1872 ¹	30 16 26.11 97 44 19.16	0 00 00	180 00 00	Austin latitude station..... Austin north meridian.....	2.0517312 0.6454223	112.65 4.42	369.6 14.5
Austin longitude station, 1895 ¹	30 16 26.24 97 44 19.16	0 00 00	180 00 00				
Austin longitude station, 1911 ¹	30 16 26.24 97 44 19.60						
St. Edwards College chapel, spire, 1903 ¹	30 13 47.34 97 45 20.37	40 57 30 76 56 43	220 53 25 256 50 43	Carpenter..... Cedar.....	4.299374 4.293171	19,923.9 19,641.3	65,367 64,440
Cedar Hill (U.S.G.S.) ¹	30 11 22.62 97 57 15.32	109 07 34	289 07 34	Cedar.....	0.930287	8,517	27.94
Kyle cotton gin, tank, 1903 ¹	30 00 19.26 97 47 02.20	75 21 18 133 34 41	255 15 37 313 31 28	Krueger..... Carpenter.....	4.276868 4.154252	18,917.7 14,264.4	62,066 46,799
Mission latitude station, 1906 ¹	29 42 52.84 98 09 51.92						
Hornbortel's (August) gin, stack, 1903 ¹	29 42 05.22 98 00 36.23	212 28 52 327 41 10	32 29 13 147 41 41	Tieken..... Seguin east base.....	3.333850 3.499571	2,157.0 3,159.2	7,077 10,365

¹ No check on this position.

Ninety-eighth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
New Braunfels Catholic Church, spire, 1903.	29 42 11.810	308 30 26.5	128 32 31.5	Seguin west base	3.938276	8,675.1	28,462
	98 07 40.327	109 38 19.4	289 37 14.1	Mission	3.575289	3,760.9	12,339
New Braunfels, spire, massive base, slim cone, 1903.	29 42 03.056	192 16 40.3	12 17 30.3	Gus	4.104555	12,722.0	41,739
	98 07 19.958	261 02 38.2	81 06 19.6	Tieken	4.084857	12,157.9	39,888
New Braunfels, courthouse tower, 1903.	29 42 11.781	193 35 22.7	13 36 17.1	Gus	4.097352	12,512.7	41,052
	98 07 28.699	262 26 36.9	82 30 22.7	Tieken	4.091731	12,351.8	40,524
		309 49 37.2	129 51 36.4	Seguin west base	3.925940	8,432.2	27,665
		108 10 04.5	288 08 53.4	Mission	3.608198	4,056.9	13,310
New Braunfels standpipe, 1903.	29 41 48.760	307 01 36.8	127 03 31.3	Seguin west base	3.891617	7,791.4	25,562
	98 07 19.201	115 39 11.0	295 37 55.2	Mission	3.658907	4,559.4	14,959
Kingsbury, tall heavy stack with cross, 1903 ¹ .	29 38 54.84	55 21 05	235 14 55	Central	4.390000	24,547.1	80,535
	97 49 41.37	67 11 52	247 07 49	Mott	4.157538	14,372.7	47,154
Church, red spire, 1903 ² .	29 36 01.54	271 30 31	91 33 17	Mott	3.957484	9,067.4	29,749
	98 03 30.58	40 55 13	220 53 35	Herndon	3.910897	8,145.1	26,723
Round tank, light-colored, east of Seguin, 1903. ²	29 34 29.41	115 44 53	295 43 14	Mott	3.776324	5,974.8	19,602
	97 54 33.75	151 34 14	331 31 36	Tieken	4.256031	18,031.5	59,158
Marion Lutheran Church, spire, 1903 ² .	29 34 13.34	297 01 55	117 05 05	Central	4.066951	11,666.8	38,277
	98 08 37.14	314 03 22	134 04 15	Herndon	3.608669	4,061.3	13,324
Marion, Schultz & Dreyer's cotton gin, stack, 1903. ²	29 34 20.67	299 15 51	119 18 52	Central	4.053429	11,309.1	37,103
	98 08 17.60	321 53 12	141 53 56	Herndon	3.588397	3,876.1	12,717
Seguin oil factory, water tower, 1903.	29 34 57.453	73 03 21.8	252 59 10.7	Herndon	4.156030	14,322.9	46,991
	97 58 19.850	133 54 03.2	313 51 30.9	Seguin west base	4.060651	11,498.8	37,726
Seguin, courthouse spire, 1903.	29 34 05.868	54 11 33.4	234 09 24.7	Central	3.938217	8,674.0	28,458
	97 57 50.025	178 16 33.0	358 16 31.2	Mott	3.521232	3,320.7	10,895
Seguin schoolhouse, short tower with 2 collars, 1903.	29 34 28.667	51 01 09.7	230 58 59.0	Central	3.962987	9,183.1	30,128
	97 57 46.160	175 32 43.7	355 32 39.9	Mott	3.419162	2,625.2	8,613
Seguin, standpipe, 1903.	29 34 03.252	136 41 47.9	316 39 00.9	Seguin west base	4.122231	13,250.5	43,473
	97 57 50.006	178 18 28.2	358 18 26.3	Mott	3.531637	3,401.2	11,150
Seguin, Zanke's gin, brick chimney, 1903.	29 34 27.995	76 49 15.1	256 44 59.4	Herndon	4.156210	14,328.8	47,010
	97 58 10.554	136 08 08.3	316 05 31.4	Seguin west base	4.090516	12,317.3	40,411
Seguin, cotton-compress building, top, 1903 ¹ .	29 34 55.63	73 52 13	253 47 52	Herndon	4.170866	14,820.6	48,624
	97 57 59.94	132 18 47	312 16 05	Seguin west base	4.076582	11,928.4	39,135
Seguin, spire, 1903 ¹ .	29 34 24.84	167 28 52	347 28 05	Seguin east base	4.071350	11,785.6	38,667
	97 57 58.42	182 38 08	2 38 10	Mott	3.437448	2,738.1	8,983
Seguin Milling & Power Co., tank, 1903.	29 34 25.998	68 10 23.5	248 07 56.6	Herndon	3.936358	8,636.9	28,336
	98 01 50.943	163 44 06.1	343 43 18.2	Seguin west base	3.969034	9,311.8	30,550
Seguin Catholic Church, spire, 1903 ¹ .	29 33 58.70	55 18 54	235 16 46	Central	3.930950	8,530.0	27,986
	97 57 50.78	178 42 38	358 42 37	Mott	3.549102	3,540.8	11,617
Herndon Hill (U.S.G.S.), 1903 ¹ .	29 32 41.52	129 30 05	309 30 05	Herndon	0.63438	4,309	14.14
	98 06 48.61	165 19 03	345 17 32	Mission	4.289118	19,458.9	63,841
Steins, church, spire, 1903.	29 28 39.844	30 08 40.6	210 05 29.5	Lavernia	4.320572	20,920.5	68,637
	98 01 45.005	171 53 39.8	351 53 27.0	Central	3.696929	5,011.1	16,441
St. Hedwig Catholic Church, 1903 ¹ .	29 24 55.78	234 15 27	54 20 28	Central	4.307985	20,322.9	66,676
	98 12 23.77	328 59 10	149 01 11	Lavernia	4.116045	13,063.1	42,858
Cestohowa church, spire, 1905 ¹ .	29 00 38.47	264 35 57	84 41 41	Ruckman	4.284728	19,263.2	63,199
	97 56 00.92	352 17 56	172 18 33	Karnes	4.173284	14,903.4	48,896
Panna Maria church, spire, 1905 ¹ .	28 57 24.99	243 40 18	63 44 58	Ruckman	4.243179	17,505.7	57,433
	97 53 52.02	9 38 03	189 37 36	Karnes	3.951262	8,938.4	29,325
Karnes City, courthouse steeple, 1904.	28 53 06.036	175 34 06.0	355 33 10.4	Stockdale	4.602492	40,039.8	131,364
	97 54 04.389	225 31 08.4	45 35 55.1	Ruckman	4.351397	22,459.3	73,685
Runge, schoolhouse steeple, 1904.	28 53 17.773	86 33 17.6	266 27 26.8	Karnes	4.294881	19,718.8	64,694
	97 42 40.876	170 51 43.1	350 50 58.9	Ruckman	4.192063	15,561.9	51,056
Runge church, tallest spire, 1904.	28 53 10.405	87 12 11.0	267 06 21.4	Karnes	4.293076	19,637.0	54,426
	97 42 43.441	171 14 30.6	351 13 47.6	Ruckman	4.197975	15,775.2	51,756
Karnes latitude station, 1906 ¹ .	28 52 38.74						
	97 54 47.05						
Jones' (Captain) house, tallest cone, 1904.	28 26 02.886	100 19 34.7	280 15 07.4	Fleming	4.190921	15,521.0	50,922
	97 45 22.807	145 43 56.7	325 43 27.4	Beeville	3.473182	2,972.9	9,754
Beeville white church, red cone, spire, 1904.	28 24 17.433	110 38 40.3	290 34 00.2	Fleming	4.233032	17,101.4	56,107
	97 44 55.841	157 06 48.8	337 06 06.6	Beeville	3.791731	6,190.6	20,310
Beeville Catholic Church, spire, 1904.	28 24 24.438	109 27 56.2	289 23 08.3	Fleming	4.241746	17,448.0	57,244
	97 44 39.396	152 30 50.0	332 30 00.0	Beeville	3.791405	6,185.9	20,295

¹ No check on this position.² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Beeville water tower, 1904.....	28 24 22.388 97 44 34.869	109 31 34.8 151 47 06.6	289 26 44.7 331 46 14.4	Fleming..... Beeville.....	4.245149 3.799294	17,585.3 6,299.3	57,694 20,667
Beeville Catholic Convent, 1904 ¹	28 24 27.85 97 44 44.44	109 17 18 153 12 37	289 12 32 333 11 50	Fleming..... Beeville.....	4.237634 3.780303	17,283.6 6,029.8	56,705 19,783
Clareville gin stack, 1905 ¹	28 19 16.21 97 51 47.34	290 50 04 334 07 50	110 51 41 154 09 35	Miller..... Skelly.....	3.777992 4.139806	5,997.8 13,797.7	19,678 45,268
Miller latitude station, 1905 ¹	28 18 06.87 97 48 21.77						
Skidmore Methodist Church, spire, 1904-5.....	28 15 18.323 97 40 39.822	67 20 08.2 163 40 33.0	247 16 36.9 343 39 49.4	Skelly..... O'Neill.....	4.120668 3.950020	13,202.9 8,912.9	43,317 29,242
Skidmore Catholic Church, spire, 1904-5.....	28 15 28.992 97 40 42.547	111 15 34.7 163 32 06.1	291 11 57.2 343 31 23.8	Miller..... O'Neill.....	4.127793 3.933330	13,421.3 8,576.9	44,033 28,139
Skidmore Baptist Church, spire, 1904-5.....	28 15 12.355 97 40 39.110	68 06 24.5 163 53 01.1	248 02 52.9 343 52 17.2	Skelly..... O'Neill.....	4.118965 3.958789	13,151.2 9,094.7	43,147 29,838
Mathis, gin stack, 1904.....	28 05 42.061 97 49 33.951	314 22 09.7 33 35 08.2	134 25 02.5 213 31 39.9	Nolan..... Reynolds.....	4.147545 4.340665	14,045.8 21,911.1	46,082 71,887
Mathis Methodist Church, spire, 1905.....	28 05 39.902 97 49 46.490	192 05 49.1 289 46 07.7	12 06 36.3 109 46 12.6	Skelly..... Mathis.....	4.113966 2.479681	13,000.7 301.8	42,653 990
McNeill's (P.E.) house, windmill, 1905.....	27 59 37.713 97 54 41.741	265 39 00.4 27 44 55.6	85 44 17.4 207 43 52.0	Nolan..... Reynolds.....	4.267247 3.900845	18,503.2 7,958.8	60,706 26,111
King's ranch house, tallest chimney, 1905 ²	27 50 53.86 97 55 37.11	5 27 24 166 25 53	185 27 02 346 25 15	Wood..... Reynolds.....	4.126252 3.970432	13,373.7 9,341.8	43,877 30,649
Banquete, Cyrus Elliff's house, chimney, 1905. ¹	27 47 40.88 97 48 27.92	60 31 02 188 37 46	240 27 20 8 37 57	Wood..... Elliff.....	4.175110 3.655082	14,966.1 4,519.4	49,101 14,827
Wood's ranch house, cupola, 1905.....	27 45 56.858 97 57 27.671	337 09 38.2 77 27 45.5	157 10 08.1 257 24 29.0	Wood..... Alice.....	3.655691 4.073641	4,525.8 11,847.9	14,848 38,871

Parkman's gin, stack, 1905 ¹	27 45 10.53 98 04 38.25	281 25 14 348 49 40	101 29 04 168 49 44	Wood..... Alice.....	4.140655 3.069508	13,824.7 1,173.6	45,357 3,850
Alice, schoolhouse spire, 1905.....	27 45 02.760 98 04 20.989	280 49 01.4 322 27 04.3	100 52 43.6 142 29 37.7	Wood..... Alice east base.....	4.124330 4.171540	13,314.7 14,843.6	43,683 48,669
Alice, Walters & Co.'s gin, stack, 1905.....	27 44 47.124 98 04 58.140	278 08 27.7 318 16 30.6	98 12 27.2 138 19 21.3	Wood..... Alice east base.....	4.153486 4.179616	14,239.2 15,122.2	46,716 49,613
Alice, Catholic Church, spire, 1913 ¹	27 45 03.50 98 04 24.94	280 49 32 349 32 49	100 53 16 169 33 26	Wood..... Alice west base.....	4.127924 4.080353	13,425.3 12,032.4	44,046 39,476
Alice, standpipe, center, 1913 ¹	27 44 59.06 98 04 14.42	280 28 39 350 47 55	100 32 18 170 48 27	Wood..... Alice west base.....	4.117832 4.073671	13,116.9 11,848.7	43,034 38,874
Alice longitude station, 1906 ¹	27 44 33.15 98 04 29.95						
Alice latitude station, 1905 ¹	27 44 33.12 98 04 29.62						
Bishop standpipe, 1913.....	27 34 54.657 97 47 35.513	300 19 00.9 77 11 17.5	120 19 37.3 257 07 12.0	Bishop..... King.....	3.397799 4.173904	2,499.2 14,924.6	8,199 48,965
Kingsville standpipe, 1913.....	27 31 08.153 97 52 03.518	116 55 03.9 238 59 57.9	296 53 02.6 59 02 38.2	King..... Bishop.....	3.907149 4.045073	8,075.1 11,093.6	26,493 36,396
Kingsville Presbyterian Church, steeple, 1913.....	27 30 59.284 97 52 11.658	119 22 58.2 238 24 07.1	299 21 00.6 58 26 51.1	King..... Bishop.....	3.903466 4.057905	8,006.9 11,426.3	26,269 37,488
Kingsville, Henrietta M. King School, cupola, 1913.....	27 30 58.775 97 52 20.554	120 21 41.5 238 57 52.8	300 19 48.1 59 00 41.0	King..... Bishop.....	3.892263 4.066065	7,803.0 11,643.0	25,600 38,199
Kingsville, Frisco Railroad shops (taller of 2 metal stacks), 1913. ¹	27 30 40.64 97 52 15.59	123 14 35 236 18 27	303 12 39 56 21 12	King..... Bishop.....	3.914501 4.072868	8,213.0 11,826.8	26,945 38,802
Kingsville Methodist Church, steeple, 1913 ¹	27 30 59.16 97 52 15.89	119 49 12 238 41 13	299 47 16 58 43 59	King..... Bishop.....	3.898065 4.061730	7,908.0 11,527.4	25,945 37,819
Ricardo schoolhouse, center of cupola, 1913 ¹	27 25 27.45 97 51 14.56	291 22 20 74 06 49	111 23 37 254 04 26	Kleberg eccentric..... Ricardo.....	3.692791 3.947861	4,929.4 8,868.7	16,173 29,097
Kleberg, 1913 ¹	27 24 29.057 97 48 27.458	94 10	274 10	Kleberg eccentric.....	8.875061	0.075	0.25
German Catholic Church, steeple, 1931 ¹	27 20 01.92 97 44 58.34	303 12 46 341 04 13	123 17 07 161 04 31	Crawford 2..... Robbins eccentric.....	4.271980 3.906638	18,706.0 3,225.8	61,371 10,583
Airway beacon, site 10, 1931.....	27 19 54.002 97 49 31.546	288 08 43.0 298 25 08.1 334 44 17.6	108 11 05.9 113 30 10.7 154 46 50.5	Robbins eccentric..... Pasadiso..... Sarita.....	3.954549 4.296270 4.333561	9,006.4 19,782.0 21,555.6	29,548 64,901 70,720

¹ No check on this position.² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Riviera schoolhouse, cupola, 1913.....	27 17 48.792 97 48 34.340	180 52 43.8 261 25 27.1	0 52 47.0 81 27 24.5	Kleberg eccentric..... Robbins.....	4.090654 3.852061	12,321.2 7,113.1	40,424 23,337
Kenedy ranch, oil-well derrick, 1913 ¹	27 14 44.63 97 42 49.96	10 33 02 160 05 53	190 32 31 340 05 12	Sarita..... Robbins.....	4.006336 3.854582	10,147.0 7,154.5	33,291 23,473
Sarita water tank, municipal, 1931.....	27 13 25.505 97 47 34.006	254 40 00.4 321 39 29.3 50 27 52.7	74 44 08.7 141 41 08.3 230 25 59.4	Pasadiso..... Sarita..... Roza.....	4.189486 3.982805 3.946061	15,469.8 9,611.8 8,850.4	50,754 31,535 29,037
Kenedy ranch, water tank, 1931.....	27 13 00.752 97 41 41.574	255 09 59.1 28 53 44.8 73 36 18.9	75 12 49.4 208 52 42.7 253 31 44.5	Crawford 2..... Sarita..... Roza.....	4.024875 3.888830 4.236242	10,589.5 7,741.6 17,228.3	34,742 25,399 56,523
Airway beacon, site 9 (red), 1931.....	27 11 01.038 97 48 01.076	78 56 52.0 204 03 33.6 294 44 47.1	258 55 11.1 24 05 14.6 114 46 38.3	Roza..... Robbins eccentric..... Sarita.....	3.792067 4.172932 3.868429	6,195.4 14,891.3 7,386.3	20,326 48,806 24,233
Tureotte section house (largest), north chimney, 1913. ¹	27 00 13.38 97 47 43.62	122 22 22 248 29 20	302 20 50 68 30 27	Tureotte..... Kenedy.....	3.824812 3.639524	6,680.5 4,360.4	21,918 14,306
Armstrong, railroad water tank, 1913 ¹	26 55 24.43 97 47 31.37	304 12 49 69 15 30	124 13 54 249 13 34	Armstrong..... Katherine.....	3.682188 3.878161	4,810.5 7,553.7	15,782 24,782
Windmill (¼ mile north-northeast of Norias' house), 1913. ¹	26 47 34.24 97 46 28.87	352 24 06 69 06 45	172 24 18 249 08 55	Norias..... Vinson.....	3.759172 4.046613	5,743.4 11,133.0	18,843 36,526
Norias' house, south gable, 1913 ¹	26 47 08.73 97 46 31.77	350 17 29 72 51 18	170 17 42 252 48 30	Norias..... Vinson.....	3.691141 4.033471	4,979.0 10,801.2	16,335 35,437
Rudolph water tank, 1913 ¹	26 41 10.06 97 46 07.70	181 38 16 350 05 25	1 38 18 170 08 48	Norias..... Yturria.....	3.785720 3.918423	6,105.5 8,287.5	20,081 27,190
Airway beacon, site 6, 1931.....	26 41 08.353 97 46 09.993	182 12 07.5 309 29 52.3 349 33 32.4	2 12 11.4 129 35 37.7 169 33 56.6	Norias..... Ladiana..... Yturria.....	3.791541 4.441990 3.914853	6,187.9 27,668.8 8,219.6	20,301 90,777 26,967
B.M. traverse station no. 9 (U.S.G.S.), 1931.....	26 38 29.326 97 34 06.942	124 34 15.1	304 34 14.8	Tarida.....	1.281488	19,120	62.73

Airway beacon, site 5, 1931.....	26 31 34.577 97 45 40.107	183 57 35.5 236 16 15.7 269 50 14.2	3 57 46.2 56 21 25.7 89 55 45.2	Yturria..... Tarida..... Ladiana.....	3.982168 4.362350 4.312245	9,597.7 23,033.0 20,523.2	31,488 75,567 67,333
Raymondville water tank, municipal, 1931.....	26 29 18.074 97 47 10.057	192 53 04.8 231 51 41.9 259 30 15.9	12 53 55.8 51 57 32.0 79 36 26.9	Yturria..... Tarida..... Ladiana.....	4.150201 4.439623 4.369309	14,131.9 27,518.4 23,405.0	46,364 90,283 76,788
Raymondville water tank, 1913 ¹	26 29 00.31 97 46 57.28	271 46 10 87 26 57	91 47 20 267 24 43	Raymond..... Brenner.....	3.639270 3.919793	4,357.8 8,313.7	14,297 27,276
Raymondville cotton gin, smokestack, 1913.....	26 28 43.306 97 47 01.884	91 04 23.3 265 02 37.4	271 02 11.7 85 03 49.6	Brenner..... Raymond.....	3.912724 3.653214	8,179.4 4,500.0	26,835 14,764
Harlingen pumping station, tall brick stack, 1913.	26 02 36.760 97 45 20.591	112 54 49.0 186 44 20.2	292 51 54.9 6 44 29.7	Maria..... Mitla.....	4.077479 3.711303	11,953.1 5,144.0	39,216 16,877
Harlingen sugar mill, latticed steel derrick, 1913. ¹	26 12 03.25 97 42 26.65	18 56 40 69 32 33	198 55 33 249 31 19	Mitla..... Harlingen.....	4.114930 3.994319	13,029.6 4,946.7	42,748 16,229
Harlingen standpipe, 1913.....	26 11 40.776 97 41 54.498	23 46 22.2 79 22 29.9	203 45 01.0 259 21 02.0	Mitla..... Harlingen.....	4.104155 3.750050	12,710.3 5,624.1	41,700 18,452
Heidelberg church steeple, 1913.....	26 11 51.497 97 52 52.606	236 44 30.2 352 52 42.2	56 44 53.9 172 53 06.8	Mercedes..... Maria.....	3.249590 4.097554	1,776.6 12,518.5	5,829 41,071
La Feria pumping station, second lift, tall stack, 1913.	26 08 17.361 97 49 25.377	35 48 27.0 150 34 16.0	215 47 20.3 330 33 08.2	Maria..... Mercedes.....	3.856775 3.938790	7,190.8 8,685.4	23,592 28,495
Santa Maria Catholic Church, steeple, 1913.....	26 04 27.921 97 50 16.082	113 42 30.8 259 08 35.4	293 41 46.5 79 10 54.8	Maria..... Mitla.....	3.485132 3.953080	3,055.8 8,975.9	10,026 29,448
Mercedes Canal pumping station, iron stack, 1913.	26 03 50.256 97 53 35.158	101 31 04.5 228 52 22.7	281 29 41.6 48 53 06.0	Rio..... Maria.....	3.728435 3.559945	5,351.0 3,630.3	17,556 11,910
La Feria pumping station, first lift, brick stack, 1913.	26 03 09.699 97 49 49.833	135 52 07.8 243 07 37.8	315 51 12.0 63 09 45.6	Maria..... Mitla.....	3.704658 3.957354	5,065.9 9,064.7	16,620 29,740
San Benito pumping station, low brick stack, 1913.	26 02 50.666 97 45 41.776	112 04 15.6 194 17 31.6	292 01 30.8 14 17 50.4	Maria..... Mitla.....	4.050966 3.683956	11,245.2 4,830.1	36,894 15,847
Mercedes, west church steeple, 1913.....	26 09 09.235 97 55 08.257	221 20 35.2 324 22 42.8	41 21 58.7 144 24 07.1	Mercedes..... Maria.....	3.900374 3.960821	7,950.1 9,137.4	26,083 29,978
Mercedes, east church steeple, 1913.....	26 08 55.350 97 54 39.369	214 49 37.1 327 09 24.5	34 50 47.8 147 10 36.0	Mercedes..... Maria.....	3.891608 3.920773	7,791.3 8,332.5	25,562 27,338
Mercedes standpipe, 1913.....	26 08 55.038 97 54 35.926	214 12 22.1 327 40 39.3	34 13 31.3 147 41 49.4	Mercedes..... Maria.....	3.889021 3.917656	7,745.0 8,272.9	25,410 27,142

¹ No check on this position.

Ninety-eighth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Progreso church steeple, 1913 ¹ -----	26 04 12.60 97 56 43.43	178 25 02 257 56 21	358 25 01 77 58 27	Rio..... Maria.....	2.579631 3.910977	379.9 8,146.6	1,246 26,728
Donna standpipe, 1913-----	26 10 05.384 98 03 00.416	315 00 50.2 329 51 57.8	135 03 36.0 149 52 04.8	Rio..... Donna.....	4.170457 2.945527	14,806.7 882.1	48,578 2,894
Donna longitude station, 1913 ¹ -----	26 09 40.60 98 02 45.61						
United States and Mexico Boundary Monument, R.P. no. 31, 1913. ¹	26 05 08.96 97 51 55.96	32 54 26	212 54 26	Maria.....	1.614053	41,120	134.91
United States and Mexico Boundary Monument, R.P. no. 28, 1913. ¹	26 04 13.37 97 56 42.22	172 55 30	352 55 30	Rio.....	2.554998	358,920	1,177.56

Ninety-eighth meridian to Point Isabel

<i>Principal points</i>							
Benito, 1913.....	26 04 37.315 97 37 33.911	96 28 48.05 133 13 59.91	276 25 32.41 313 10 37.46	Mitla..... Harlingen.....	4.0949883 4.2434941	12,444.81 17,518.39	40,829.3 57,474.9
Cowgill, 1913.....	26 10 44.018 97 35 19.595	18 18 18.56 58 28 13.97	198 17 19.41 238 23 58.81	Benito..... Mitla.....	4.0750252 4.2761415	11,885.71 18,886.07	38,995.0 61,962.0
		92 29 46.33	272 25 24.25	Harlingen.....	4.2177111	16,508.63	54,162.1
Olmito, 1913.....	26 03 09.397 97 31 39.836	105 23 33.85 156 26 09.09	285 20 58.27 336 24 32.35	Benito..... Cowgill.....	4.0088933 4.1836866	10,206.89 15,264.64	33,487.1 50,080.7
Resaca, 1913.....	26 08 45.711 97 28 08.530	29 34 50.43 64 05 12.43	209 33 17.47 244 01 03.59	Olmito..... Benito.....	4.0755176 4.2422941	11,899.19 17,470.05	39,039.3 57,316.3
		106 56 29.08	286 53 19.01	Cowgill.....	4.0973671	12,513.16	41,053.6
Arista, 1885.....	26 00 13.431 97 21 28.506	107 42 28.45 144 49 51.91	287 38 00.19 324 46 56.08	Olmito..... Resaca.....	4.2513787 4.2853493	17,839.34 19,290.76	58,527.9 63,289.8

Point Isabel west base, 1906.....	26 06 19.573 97 19 14.853	18 15 27.40 74 15 43.71	198 14 28.70 254 10 16.21	Arista..... Olmito.....	4.0742375 4.3327627	11,864.17 21,516.06	38,924.4 70,590.6
		106 54 23.89	286 50 28.89	Resaca.....	4.1901441	15,493.31	50,831.0
<i>Supplementary points</i>							
Rio Hondo standpipe, 1913.....	26 14 16.375 97 34 38.100	9 59 58.2 15 20 04.5	189 59 39.9 195 18 47.1	Cowgill..... Benito.....	3.821896 4.266626	6,635.8 18,476.8	21,771 60,619
		313 13 39.2	133 16 31.2	Resaca.....	4.171751	14,850.8	48,723
Cowgill water tank, 1913 ¹	26 09 51.80 97 36 10.98	13 23 48 221 36 03	193 23 11 41 36 25	Benito..... Cowgill.....	3.997747 3.332262	9,948.3 2,149.1	32,639 7,051
San Benito sugar mill, tall brick stack, 1913.....	26 08 28.848 97 38 28.650	62 10 52.9 113 25 57.8	242 08 01.1 293 22 59.2	Mitla..... Harlingen.....	4.088531 4.088280	12,261.1 12,254.1	40,227 40,204
		231 36 04.9	51 37 28.3	Cowgill.....	3.825990	6,698.7	21,977
		310 50 47.8	130 53 47.7	Olmito.....	4.176761	15,023.1	49,288
		347 56 49.6	167 57 13.7	Benito.....	3.862466	7,285.6	23,903
San Benito standpipe, 1913.....	26 08 01.520 97 37 57.730	115 16 40.1 221 16 58.6	295 13 27.9 41 18 08.3	Harlingen..... Cowgill.....	4.126569 3.823186	13,383.5 6,655.6	43,909 21,836
		310 32 31.8	130 35 18.0	Olmito.....	4.140621	13,823.6	45,353
		353 59 11.3	173 59 21.7	Benito.....	3.800639	6,318.9	20,731
San Benito Bank & Trust Co. building, cupola on the southwest corner, 1913 ¹	26 07 50.06 97 37 57.28	219 16 38 309 26 49	39 17 48 129 29 35	Cowgill..... Olmito.....	3.839884 4.133135	6,916.5 13,587.4	22,692 44,578
Olmito factory, north stack, 1913 ¹	25 56 52.25 97 33 53.79	197 47 16 253 19 40	17 48 15 73 25 07	Olmito..... Arista.....	4.085972 4.335175	12,189.1 21,635.9	39,990 70,984
Olmito factory, south stack, 1913 ¹	25 56 51.40 97 33 54.22	197 48 12 253 16 13	17 49 11 73 21 40	Olmito..... Arista.....	4.086991 4.335556	12,217.7 21,654.9	40,084 71,046

Texas-California arc

<i>Principal points</i>							
Rattlesnake, 1908.....	32 21 43.997 98 30 41.828	199 24 20.52 251 26 54.09	19 30 32.31 71 37 09.03	Kyle..... McClenny.....	4.7326896 4.4998498	54,036.80 31,611.84	177,285.7 103,713.2
Lacasa, 1908.....	32 39 05.092 98 41 29.752	241 26 40.59 295 04 49.57	61 38 44.23 115 20 55.59	Kyle..... McClenny.....	4.5980029 4.7141103	39,628.06 51,773.83	130,013.1 169,861.3
		332 08 41.96	152 14 30.16	Rattlesnake.....	4.5593776	36,255.81	118,949.3
Pierce, 1908.....	32 30 55.820 98 43 41.256	192 48 37.59 309 47 52.68	12 49 48.41 129 54 50.77	Lacasa..... Rattlesnake.....	4.1891182 4.4236295	15,456.75 26,523.42	50,711.0 87,018.9

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Hearn, 1908.....	32 15 21.133	210 08 37.12	30 14 20.38	Pierce.....	4.5225656	33,309.31	109,282.3
	98 54 22.115	252 17 06.09	72 29 45.22	Rattlesnake.....	4.5908604	38,981.67	127,892.4
Flat, 1908.....	32 29 48.713	226 56 23.16	47 02 42.42	Lacasa.....	4.4001289	25,126.32	82,435.3
	98 53 14.174	262 05 15.23	82 10 23.12	Pierce.....	4.1788993	15,097.30	49,531.7
		3 48 26.14	183 47 49.76	Hearn.....	4.4278558	26,782.79	87,869.9
Springgap, 1908.....	32 15 54.952	235 47 15.62	56 00 12.65	Flat.....	4.6608968	45,803.31	150,273.0
	99 17 25.078	271 32 44.97	91 45 03.15	Hearn.....	4.5588627	36,212.85	118,808.3
Hitson (U.S.G.S.), 1908.....	32 28 36.044	266 41 54.70	86 55 41.81	Flat.....	4.6049652	40,268.48	132,114.2
	99 18 54.110	354 19 24.89	174 20 12.56	Springgap.....	4.3721562	23,558.96	77,293.0
Lamb, 1908.....	32 21 40.216	225 54 09.87	45 59 29.11	Flat.....	4.3352686	21,640.56	70,999.1
	99 03 09.489	310 12 14.65	130 16 56.52	Hearn.....	4.2570629	18,074.36	59,299.0
		64 38 52.24	244 31 14.89	Springgap.....	4.3940942	24,779.59	81,297.7
		117 29 51.78	297 21 25.36	Hitson (U.S.G.S.).....	4.4441587	27,807.29	91,231.1
Kennard, 1908.....	32 29 55.308	277 47 22.61	97 53 27.38	Hitson (U.S.G.S.).....	4.2528180	17,898.56	58,722.2
	99 30 13.239	322 08 31.69	142 15 23.09	Springgap.....	4.5153443	32,760.03	107,480.2
Clayton, 1908.....	32 15 19.373	211 41 43.37	31 47 25.30	Kennard.....	4.5014286	31,726.97	104,090.9
	99 40 51.777	268 11 26.98	88 23 57.83	Springgap.....	4.5662672	36,835.55	120,851.3
Clyde, 1908.....	32 24 44.892	242 13 39.36	62 18 17.50	Hitson (U.S.G.S.).....	4.1847000	15,300.30	50,197.7
	99 27 32.562	315 43 54.27	135 49 19.23	Springgap.....	4.3575184	22,778.15	74,731.3
		50 15 07.29	230 07 59.83	Clayton.....	4.4347116	27,208.94	89,288.0
		156 18 56.59	336 17 30.36	Kennard.....	4.0187913	10,442.18	34,259.1
Morrison, 1908.....	32 30 24.297	271 29 00.56	91 40 08.51	Kennard.....	4.5113739	32,461.90	106,502.1
	99 50 56.309	330 24 20.13	150 29 43.89	Clayton.....	4.5057168	32,041.79	105,123.8
Buzzard, 1908.....	32 21 40.733	212 47 35.25	32 51 08.81	Morrison.....	4.2831025	19,191.22	62,963.2
	99 57 34.500	250 19 05.37	70 33 45.53	Kennard.....	4.6580544	45,504.51	149,292.7
		294 02 55.68	114 11 51.61	Clayton.....	4.4585129	28,741.73	94,296.8
Sears, 1908.....	32 33 30.649	287 52 24.96	107 58 30.68	Morrison.....	4.2707188	18,651.72	61,193.2
	100 02 16.359	341 22 27.75	161 24 59.03	Buzzard.....	4.3631117	23,073.40	75,700.0

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Hale, 1908.....	32 25 56.036	219 20 43.86	39 24 40.39	Sears.....	4.2580745	18,116.51	59,437.2
	100 09 36.624	254 08 39.34	74 18 40.79	Morrison.....	4.4828808	30,400.50	99,739.0
		292 34 02.18	112 40 29.09	Buzzard.....	4.3105996	20,445.59	67,078.6
Boyd, 1908.....	32 27 20.556	239 48 16.58	59 55 00.83	Sears.....	4.3561157	22,704.70	74,490.3
	100 14 48.574	287 41 43.52	107 44 30.87	Hale.....	3.9321875	8,554.36	28,065.4
Allen, 1908.....	32 35 30.370	277 57 43.09	98 06 42.22	Sears.....	4.4212347	26,377.56	86,540.4
	100 18 57.701	320 20 23.64	140 25 25.20	Hale.....	4.3610968	22,966.60	75,349.6
		336 40 08.01	156 42 21.95	Boyd.....	4.2156177	16,429.25	53,901.6
Patterson, 1909.....	32 30 24.750	246 25 17.67	66 32 43.79	Allen.....	4.3727962	23,593.71	77,407.0
	100 32 46.882	281 18 46.87	101 28 25.95	Boyd.....	4.4582039	28,721.28	94,229.7
Lloyd, 1909.....	32 19 52.262	165 25 45.02	345 24 01.00	Patterson.....	4.3038708	20,131.25	66,047.3
	100 29 32.862	209 48 38.10	29 54 19.01	Allen.....	4.5226975	33,919.42	109,315.5
		239 04 36.75	59 12 30.49	Boyd.....	4.4301188	26,922.71	88,328.9
Bench, 1909.....	32 17 56.908	184 28 15.18	4 28 52.16	Patterson.....	4.3637279	23,106.16	75,807.5
	100 33 55.884	242 40 01.78	62 42 22.39	Lloyd.....	3.8889419	7,743.58	25,405.4
Wolf, 1909.....	32 28 16.999	258 08 00.80	78 14 27.90	Patterson.....	4.2838154	19,222.74	63,066.6
	100 44 47.557	302 58 18.44	123 06 28.58	Lloyd.....	4.4550822	28,515.58	93,554.9
		318 13 31.09	138 19 20.13	Bench.....	4.4081124	25,592.48	83,964.7
Bynum, 1909.....	32 19 15.696	234 58 37.98	55 06 46.96	Wolf.....	4.4639283	29,102.37	95,480.0
	101 00 00.213	273 16 39.84	93 30 35.98	Bench.....	4.6127268	40,994.61	134,496.5
Cuthbert, 1909.....	32 28 54.348	272 22 53.35	92 32 04.47	Wolf.....	4.4285456	26,825.36	88,009.5
	101 01 53.932	294 39 33.50	114 54 32.41	Bench.....	4.6840221	48,306.34	158,491.6
		350 31 31.59	170 32 32.52	Bynum.....	4.2569634	18,070.22	59,285.4
Top, 1909.....	32 26 41.883	259 22 48.41	79 30 18.38	Cuthbert.....	4.3477237	22,270.18	73,064.7
	101 15 52.244	298 50 26.06	118 58 55.94	Bynum.....	4.4537487	28,428.16	93,268.1
Signal, 1909.....	32 11 44.176	189 40 33.85	9 42 10.36	Top.....	4.4479602	28,051.77	92,033.2
	101 18 52.744	219 56 34.25	40 05 39.25	Cuthbert.....	4.6173598	41,434.28	135,939.0
		244 46 54.60	64 56 59.08	Bynum.....	4.5151337	32,744.15	107,428.1
Evart, 1909.....	32 21 46.964	247 27 59.94	67 35 30.33	Top.....	4.3759883	23,767.76	77,978.1
	101 29 52.685	317 01 27.65	137 07 20.09	Signal.....	4.4041021	25,357.25	83,192.9
Williams, 1909.....	32 11 24.876	165 36 33.09	345 34 52.66	Evart.....	4.2963064	19,783.65	64,906.9
	101 26 44.620	211 05 22.81	31 11 11.58	Top.....	4.5185225	33,000.65	108,269.6
		267 12 41.69	87 16 53.09	Signal.....	4.0925242	12,374.40	40,598.3
Stanton, 1909.....	32 07 32.804	224 31 55.89	44 40 44.76	Evart.....	4.5676648	36,954.28	121,240.8
	101 46 23.951	256 53 19.02	77 03 46.73	Williams.....	4.5013141	31,718.61	104,063.5
Epley, 1909.....	32 16 32.127	254 26 03.87	74 38 00.26	Evart.....	4.5606989	36,366.28	119,311.7
	101 52 12.634	283 11 45.42	103 25 20.41	Williams.....	4.6139549	41,110.70	134,877.4
		331 10 28.58	151 13 34.39	Stanton.....	4.2777680	18,956.93	62,194.5

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>							
Stanton south base, 1909.....	32 05 33.453	189 38 44.06	9 39 54.24	Epley.....	4.3134424	20,579.86	67,519.1
	101 54 24.396	253 41 40.45	73 45 55.82	Stanton.....	4.1179852	13,121.55	43,049.6
Stanton north base, 1909.....	32 11 37.895	228 49 18.53	48 52 49.82	Epley.....	4.1390323	13,773.12	45,187.3
	101 58 48.760	291 05 31.98	111 12 08.43	Stanton.....	4.3206743	20,925.43	68,652.8
		328 17 50.46	148 20 11.12	Stanton south base.....	4.1202889	13,191.34	43,278.6
Elkins, 1909.....	32 02 32.969	192 28 45.91	12 30 01.31	Stanton north base.....	4.2353103	17,191.36	56,402.0
	102 01 10.585	242 24 54.61	62 28 30.26	Stanton south base.....	4.0798031	12,017.19	39,426.4
Dunn, 1909.....	32 09 07.978	252 50 01.56	72 55 06.18	Stanton north base.....	4.1954295	15,683.01	51,453.3
	102 08 20.830	286 42 32.58	106 49 57.34	Stanton south base.....	4.3598360	22,900.03	75,131.2
		317 07 50.59	137 11 39.21	Elkins.....	4.2199040	16,592.20	54,436.2
Scar, 1909.....	31 56 14.258	187 03 21.43	7 04 21.16	Dunn.....	4.3804596	24,013.73	78,785.0
	102 10 13.396	230 39 23.65	50 44 11.21	Elkins.....	4.2651732	18,415.06	60,416.7
Morris, 1909.....	32 02 27.307	233 57 28.05	54 03 12.34	Dunn.....	4.3221972	20,998.93	68,894.0
	102 19 08.770	269 34 02.38	89 43 34.41	Elkins.....	4.4516115	28,288.60	92,810.2
		309 13 41.58	129 18 25.20	Scar.....	4.2589637	18,153.64	59,559.1
Bates, 1909.....	31 58 10.731	179 19 30.03	359 19 28.15	Morris.....	3.8978110	7,903.35	25,929.6
	102 19 05.221	284 21 58.39	104 26 39.85	Scar.....	4.1589686	14,420.11	47,310.0
Odessa, 1909.....	31 51 47.898	193 17 06.55	13 18 02.61	Bates.....	4.0833614	12,116.06	39,750.8
	102 20 51.258	243 52 22.82	63 57 59.90	Scar.....	4.2709396	18,661.20	61,224.3
Smith, 1909.....	31 58 34.969	242 18 21.08	62 22 56.88	Morris.....	4.1780186	15,066.72	49,431.4
	102 27 49.082	273 04 05.37	93 08 42.77	Bates.....	4.1390891	13,774.92	45,193.2
		318 46 03.06	138 49 43.98	Odessa.....	4.2217818	16,664.10	54,672.1
Dublin, 1909.....	31 51 53.349	234 11 17.69	54 17 03.35	Smith.....	4.3256294	21,165.54	69,440.6
	102 38 42.818	270 15 46.46	90 25 12.15	Odessa.....	4.4497699	28,168.90	92,417.5
Douro, 1909.....	31 42 28.224	145 39 48.37	325 35 50.02	Dublin.....	4.3240216	21,087.33	69,184.0
	102 31 10.339	190 03 45.31	10 05 31.48	Smith.....	4.4806164	30,242.41	99,220.3
		223 19 52.90	43 25 18.99	Odessa.....	4.3750357	23,715.69	77,807.2
Curtis, 1909.....	31 36 31.641	176 08 33.13	356 07 54.82	Dublin.....	4.4541258	28,452.85	93,349.1
	102 37 30.001	222 17 54.10	42 21 13.37	Douro.....	4.1718642	14,854.71	48,735.8

Harris, 1909.....	31 42 33.233	222 26 44.71	42 32 01.10	Dublin.....	4.3691234	23,395.02	76,755.2
	102 48 43.459	270 14 30.77	90 23 44.29	Douro.....	4.4429575	27,730.49	90,979.1
		302 04 00.82	122 09 54.29	Curtis.....	4.3211441	20,948.07	68,727.1
Estes, 1909.....	31 29 50.115	211 10 18.85	31 15 01.94	Harris.....	4.4390274	27,480.68	90,159.5
	102 57 43.663	248 47 20.58	68 57 55.68	Curtis.....	4.5354994	34,316.21	112,585.8
Aroya, 1909.....	31 38 58.053	253 07 02.15	73 14 19.21	Harris.....	4.3598434	22,900.42	75,132.5
	103 02 35.685	276 22 25.25	96 35 34.86	Curtis.....	4.6013622	39,935.78	131,022.6
		335 27 05.30	155 29 38.20	Estes.....	4.2683364	18,549.68	60,858.4
Lee, 1909.....	31 27 29.557	215 23 58.65	35 28 58.09	Aroya.....	4.4154298	26,027.34	85,391.4
	103 12 07.910	259 11 33.85	79 19 05.13	Estes.....	4.3658629	23,220.04	76,181.1
Johnson, 1909.....	31 36 08.532	258 49 49.82	78 58 39.51	Aroya.....	4.4334379	27,129.26	89,006.6
	103 19 25.834	288 38 56.38	108 50 17.73	Estes.....	4.5595437	36,269.68	118,994.8
		324 06 30.56	144 10 19.57	Lee.....	4.2949482	19,721.87	64,704.2
Hays, 1909.....	31 29 54.700	184 15 47.39	4 16 04.43	Johnson.....	4.0624133	11,545.51	37,878.9
	103 19 58.392	289 45 43.29	109 49 48.97	Lee.....	4.1205384	13,198.92	43,303.5
Ingle, 1909.....	31 35 48.685	268 32 40.13	88 41 02.37	Johnson.....	4.4027078	25,275.97	82,926.2
	103 35 24.355	293 59 15.41	114 07 19.87	Hays.....	4.4272689	26,746.62	87,751.2
Sist, 1909.....	31 21 19.967	162 09 37.93	342 06 47.37	Ingle.....	4.4488637	28,110.19	92,224.8
	103 29 57.700	211 18 53.61	31 24 23.56	Johnson.....	4.5058051	32,048.31	105,145.2
		224 54 42.72	44 59 55.20	Hays.....	4.3502815	22,401.73	73,496.3
		247 59 01.41	68 08 18.89	Lee.....	4.4838156	30,466.01	99,953.9
Round, 1909.....	31 28 54.319	245 31 26.94	65 40 44.85	Ingle.....	4.4898817	30,894.54	101,359.8
	103 53 10.941	290 43 06.68	110 55 12.96	Sist.....	4.5951677	39,370.21	129,167.1
Toyah, 1909.....	31 07 45.319	169 43 32.98	349 41 13.52	Round.....	4.5990238	39,721.33	130,319.1
	103 48 42.536	202 04 59.67	22 11 55.09	Ingle.....	4.7479646	55,971.19	183,632.1
		229 47 31.75	49 57 15.15	Sist.....	4.5902695	38,928.67	127,718.5
Seay, 1909.....	31 16 15.110	235 07 44.91	55 18 48.30	Round.....	4.6126943	40,991.55	134,486.4
	104 14 25.081	290 55 06.01	111 08 25.09	Toyah.....	4.6409903	43,751.23	143,540.5
Newman, 1909.....	31 00 06.830	152 14 21.44	332 09 14.52	Seay.....	4.5277801	33,711.66	110,602.3
	104 04 31.522	198 39 10.47	18 45 03.45	Round.....	4.7494845	56,167.42	184,275.9
		240 37 47.40	60 45 57.09	Toyah.....	4.4601494	28,850.24	94,652.8
Reynolds, 1909.....	31 11 09.628	232 28 06.08	52 32 06.27	Seay.....	4.1890659	15,454.89	50,704.9
	104 22 08.372	306 00 21.66	126 09 27.46	Newman.....	4.5398096	34,658.49	113,708.7
Krouse, 1909.....	31 12 05.239	246 36 44.05	66 42 33.53	Seay.....	4.2883403	19,424.07	63,727.1
	104 25 39.007	287 03 25.03	107 05 14.13	Reynolds.....	3.7659504	5,833.79	19,139.7
		303 16 49.23	123 27 43.97	Newman.....	4.6044596	40,221.62	131,960.4
Chispa, 1909.....	30 48 09.671	211 15 54.85	31 24 37.51	Krouse.....	4.7140007	51,760.76	169,818.4
	104 42 33.743	217 19 42.85	37 30 13.87	Reynolds.....	4.7284049	53,506.30	175,545.3
		249 48 56.95	70 08 29.06	Newman.....	4.8096017	64,506.24	211,634.2

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Diablo, 1909.....	31 11 52.432	269 23 11.70	89 38 18.84	Krouse.....	4.6661602	46,361.79	152,105.3
	104 54 50.160	335 54 56.74	156 01 16.03	Chispa.....	4.6810025	47,973.62	157,393.5
Eagle, 1909.....	30 55 16.421	207 58 19.12	28 03 36.71	Diablo.....	4.5408924	34,745.01	113,992.6
	105 05 05.722	290 00 00.17	110 11 33.70	Chispa.....	4.5826037	38,247.56	125,483.9
		243 29 22.27	63 49 43.40	Krouse.....	4.8452061	70,017.42	229,715.5
Quitman, 1909.....	31 08 58.537	264 20 16.08	84 38 20.97	Diablo.....	4.7463115	55,758.55	182,934.5
	105 29 46.011	302 42 47.47	122 55 30.66	Eagle.....	4.6694368	46,712.89	153,257.2
Black, 1909.....	31 34 21.594	331 47 53.74	151 55 11.79	Diablo.....	4.6732190	47,121.49	154,597.8
	105 08 51.285	35 20 58.52	215 10 05.52	Quitman.....	4.7592502	57,444.73	188,466.6
		355 15 34.49	175 17 31.49	Eagle.....	4.8601642	72,470.98	237,765.2
Corduna (N.Mex.), 1909.....	32 01 31.147	325 07 54.06	145 19 32.07	Black.....	4.7860428	61,100.23	200,459.7
	105 30 55.922	358 54 26.46	178 55 03.08	Quitman.....	4.9872831	97,114.29	318,615.8
North Franklin, 1909.....	31 54 10.122	261 22 44.74	81 53 47.79	Corduna.....	4.9703593	93,402.67	306,438.6
	106 29 35.111	311 08 57.76	131 40 14.54	Quitman.....	5.1012485	126,254.97	414,221.5
		285 39 50.35	106 22 18.45	Black.....	5.1227205	132,654.04	435,215.8
Jarilla (N.Mex.), 1909.....	32 23 59.582	306 16 21.87	126 35 27.27	Corduna.....	4.8447153	69,938.34	229,456.0
	106 06 44.618	33 11 21.24	212 59 11.91	North Franklin.....	4.8181361	65,786.39	215,834.2
Kent (N.Mex.), 1909.....	32 30 27.079	288 48 34.98	109 00 30.87	Jarilla.....	4.5662236	36,831.86	120,839.2
	106 28 58.694	300 08 13.62	120 39 12.97	Corduna.....	5.0239830	105,677.62	346,710.7
		00 49 03.35	180 48 43.94	North Franklin.....	4.8264711	67,061.17	220,016.5
Cooks (N.Mex.), 1910.....	32 32 09.225	271 12 05.85	91 52 21.20	Kent.....	5.0692715	117,292.84	384,818.3
	107 43 51.263	300 42 01.19	121 21 37.14	North Franklin.....	5.1341010	136,176.14	446,771.2
Hermanas (N.Mex.), 1910.....	31 48 11.260	194 03 30.75	14 10 26.00	Cooks.....	4.9231597	83,783.73	274,880.5
	107 56 51.173	265 01 33.00	85 47 36.39	North Franklin.....	5.1401949	138,100.38	453,084.3
Florida (N.Mex.), 1910.....	32 07 01.516	41 10 49.84	221 00 37.78	Hermanas.....	4.6645862	46,194.06	151,555.0
	107 37 34.887	168 03 36.06	348 00 14.79	Cooks.....	4.6764471	47,473.04	155,751.1
		247 47 27.51	68 24 07.81	Kent.....	5.0646596	116,053.87	380,753.4
		282 12 36.18	102 48 38.78	North Franklin.....	5.0401306	109,680.81	359,844.5

Cerro Alto, 1909.....	31 56 42.827	84 42 15.87	264 25 40.59	North Franklin.....	4.6060761	49,667.93	162,952.2
	105 58 12.954	142 21 24.62	322 05 00.33	Kent.....	4.8970094	78,887.73	258,817.5
		165 08 50.80	345 04 18.35	Jarilla.....	4.7173931	52,166.67	171,150.1
San Ignacio (Mexico), 1931.....	31 16 17.071	148 04 06.49	327 49 35.64	North Franklin.....	4.9160694	82,597.98	270,990.2
	106 01 52.557	184 24 52.26	04 26 47.36	Cerro Alto.....	4.8746828	74,934.67	245,848.2
Puerto del Presidio (Mexico), 1931.....	31 24 11.534	172 33 47.00	352 31 22.58	North Franklin.....	4.7471594	55,867.52	183,292.0
	106 24 59.915	215 02 28.19	35 16 32.00	Cerro Alto.....	4.8663391	73,508.76	241,170.0
		291 37 22.83	111 49 24.36	San Ignacio.....	4.5963713	39,479.47	129,525.6
<i>Supplementary points</i>							
Lacasa latitude station, 1912 ¹	32 39 05.09						
	98 41 29.65						
Carbon schoolhouse, belfry, 1908 ¹	32 16 02.32	80 42 13	260 39 35	Hearn.....	3.893997	7,834.2	25,703
	98 49 26.75	250 14 11	70 24 13	Rattlesnake.....	4.494874	31,251.7	102,532
Eastland courthouse, 1908 ¹	32 24 04.50	27 12 17	207 09 28	Hearn.....	4.258210	18,122.2	59,456
	98 49 05.60	143 32 14	328 30 01	Flat.....	4.094575	12,433.0	40,791
Eastland schoolhouse, belfry, 1908 ¹	32 24 01.99	26 36 24	206 33 40	Hearn.....	4.253828	17,940.2	58,859
	98 49 15.16	149 42 34	329 40 26	Flat.....	4.092408	12,371.1	40,588
Cisco astronomic station (U.S.G.S.), 1908.....	32 23 24.817	63 49 22.7	243 47 08.6	Lamb.....	3.863256	7,298.9	23,946
	98 58 58.956	217 16 03.7	37 19 08.7	Flat.....	4.172145	14,864.3	48,767
Cisco standpipe, 1908.....	32 23 24.745	334 06 03.9	154 08 31.6	Hearn.....	4.218974	16,556.7	54,320
	98 58 58.393	64 30 14.3	244 20 22.5	Springgap.....	4.506372	32,090.2	105,283
Cisco Methodist Church, spire, 1908 ¹	32 23 09.15	333 32 02	153 34 29	Hearn.....	4.206852	16,101.0	52,825
	98 58 56.25	67 32 19	247 30 03	Lamb.....	3.855185	7,164.5	23,506
Church 7 miles south of Cisco, 1908.....	32 18 27.378	311 46 08.2	131 48 19.2	Hearn.....	3.934954	8,609.0	28,245
	98 58 27.418	81 07 18.2	260 57 10.5	Springgap.....	4.479097	30,136.8	98,874
Baird courthouse, dome, 1908.....	32 23 40.214	108 01 25.8	287 59 20.1	Clyde.....	3.809218	6,444.9	21,145
	99 23 38.021	219 07 18.4	39 09 50.6	Hitson.....	4.070013	11,749.3	38,547
Baird latitude station, 1912 ¹	32 23 40.65						
	99 23 39.30						
Baird, tall church, spire, 1908 ¹	32 23 39.22	220 17 00	40 19 39	Hitson.....	4.078789	11,989.2	39,335
	99 23 50.98	324 45 29	144 48 56	Springgap.....	4.243127	17,503.6	57,426
Clyde, church spire, 1908 ¹	32 24 21.85	256 07 06	76 08 05	Clyde.....	3.471342	2,960.3	9,712
	99 29 22.54	309 42 41	129 49 05	Springgap.....	4.387571	24,410.2	80,086
Abilene standpipe (U.S.G.S.), 1908.....	32 26 44.638	65 08 02.7	245 01 09.6	Buzzard.....	4.346628	22,214.1	72,881
	99 44 43.625	124 50 17.1	304 46 57.0	Morrison.....	4.073816	11,852.7	38,887

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
Abilene courthouse, dome, 1908.....	32 26 44.600 99 43 54.383	347 14 21.7 66 28 08.0	167 15 59.4 246 20 48.5	Clayton..... Buzzard.....	4.335260 4.368973	21,640.1 23,386.9	70,998 76,729	
Abilene, low standpipe, 1908.....	32 26 44.161 99 44 43.806	343 56 08.6 124 54 31.6	163 58 12.8 304 51 11.6	Clayton..... Morrison.....	4.341408 4.073978	21,948.7 11,857.1	72,010 38,901	
Abilene asylum stack, 1908 ¹	32 25 05.46 99 43 13.28	348 24 17 74 24 50	168 25 33 254 17 09	Clayton..... Buzzard.....	4.265483 4.368775	18,428.2 23,376.3	60,460 76,694	
Church north of Tye, belfry, 1908 ¹	32 45 01.80 99 47 57.55	19 16 13 43 55 40	199 11 02 223 43 50	Buzzard..... Hale.....	4.659986 4.698505	45,707.3 49,946.5	149,958 163,866	
Tye Baptist Church, spire, 1908.....	32 27 20.436 99 51 56.343	40 12 21.4 195 27 58.9	220 09 20.1 15 28 31.1	Buzzard..... Morrison.....	4.136589 3.769117	13,695.9 5,876.5	44,934 19,280	
Tye Methodist Church, spire, 1908.....	32 27 32.408 99 52 08.343	38 13 08.7 199 33 08.8	218 10 13.9 19 33 42.5	Buzzard..... Morrison.....	4.139359 3.749650	13,783.5 5,618.9	45,221 18,435	
Church 6 miles west of Morrison, belfry, 1908 ¹	32 32 34.27 99 56 40.60	293 59 24 101 14 21	114 02 29 281 11 20	Morrison..... Sears.....	3.992862 3.950878	9,837.0 8,930.5	32,274 29,299	
Merkel, church, square spire, 1908.....	32 28 04.963 100 00 49.064	73 57 45.0 167 12 33.0	253 53 01.9 347 11 46.0	Hale..... Sears.....	4.156573 4.012322	14,340.8 10,287.8	47,050 33,753	
Merkel, electric light plant, tall stack, 1908.....	32 28 07.008 100 00 18.414	74 34 29.6 162 50 53.4	254 29 30.1 342 49 50.0	Hale..... Sears.....	4.179782 4.018440	15,128.0 10,433.7	49,632 34,231	
Merkel, tall water tank, 1908.....	32 28 11.350 100 00 32.941	73 40 58.3 164 39 38.9	253 36 06.6 344 38 43.3	Hale..... Sears.....	4.170253 4.008565	14,799.7 10,199.2	48,555 33,462	
Sears latitude station, 1912 ¹	32 33 30.65 100 02 16.45							
Trent schoolhouse, belfry, 1908 ¹	32 29 28.31 100 07 09.28	30 29 15 71 52 06	210 27 56 251 48 00	Hale..... Boyd.....	3.880072 4.101148	7,587.0 12,622.6	24,892 41,413	
Trent Christian Church, spire, 1908 ¹	32 29 20.44 100 07 10.33	31 15 44 72 53 04	211 14 25 252 48 58	Hale..... Boyd.....	3.867160 4.097712	7,364.8 12,523.1	24,163 41,083	

Eskota water tank, 1908 ¹	32 31 44.64 100 15 30.22	319 17 05 352 23 04	139 20 15 172 23 26	Hale..... Boyd.....	4.151110 3.914184	14,161.5 8,207.0	46,462 26,926
Sweetwater schoolhouse, cupola, 1908 ¹	32 28 29.96 100 24 02.73	211 33 17 278 21 44	31 36 01 98 26 41	Allen..... Boyd.....	4.181867 4.165215	15,200.8 14,629.0	49,871 47,996
Wasp (U.S.G.S.), 1908.....	32 34 04.541 100 26 40.028	257 35 55.3 54 45 28.4	77 40 04.3 234 42 11.2	Allen..... Patterson.....	4.091487 4.069114	12,344.9 11,725.0	40,502 38,468
Roscoe cotton gin, stack, 1909.....	32 26 52.552 100 32 07.662	342 37 58.5 9 44 16.0	162 39 21.4 189 43 18.1	Lloyd..... Bench.....	4.132376 4.223758	13,563.6 16,740.1	44,500 54,921
Roscoe schoolhouse, cupola, 1909.....	32 26 17.801 100 32 26.908	339 01 35.0 8 34 48.8	159 03 08.2 188 34 01.1	Lloyd..... Bench.....	4.104391 4.193214	12,717.2 15,603.2	41,723 51,191
Loraine schoolhouse, cupola, 1909 ¹	32 24 10.44 100 42 44.24	157 01 27 309 44 55	337 00 21 129 49 38	Wolf..... Bench.....	3.916443 4.254769	8,249.8 17,975.1	27,066 58,986
Colorado, west standpipe, 1909.....	32 22 57.806 100 50 18.000	221 15 37.3 289 46 12.6	41 18 34.6 109 54 58.0	Wolf..... Bench.....	4.116756 4.436236	13,084.5 27,304.6	42,928 89,582
Bynum latitude station, 1912 ¹	32 19 15.70 101 00 00.29						
Westbrook Methodist Church, spire, 1909 ¹	32 21 29.79 101 00 52.42	173 18 38 341 42 16	353 18 05 161 42 44	Cuthbert..... Bynum.....	4.139495 3.638502	13,787.8 4,350.1	45,235 14,272
Morgans Peak, 1909.....	32 21 13.738 101 02 37.336	116 00 16.3 184 34 00.8	295 53 10.4 4 34 24.1	Top..... Cuthbert.....	4.363665 4.153310	23,102.8 14,233.4	75,796 46,697
Muchakooago (Mushaway) Peak, 1909.....	32 43 26.350 101 24 02.305	307 41 36.6 337 31 08.7	127 53 32.4 157 35 32.6	Cuthbert..... Top.....	4.641797 4.524751	43,832.6 33,477.3	143,807 109,833
Stanton longitude station, 1911.....	32 07 32.731 101 46 23.951	180	0	Stanton.....	0.354108	2.26	7.4
Midland courthouse, cupola, 1909.....	31 59 52.323 102 04 32.949	53 06 21.4 160 46 01.4	233 03 21.2 340 44 00.5	Sear..... Dunn.....	4.048499 4.258360	11,181.5 18,128.4	36,685 59,476
Odessa courthouse, cupola, 1909 ¹	31 50 49.38 102 22 03.02	147 38 56 226 18 23	327 35 53 46 19 00	Smith..... Odessa.....	4.229931 3.416494	16,979.7 2,609.1	55,708 8,560
Castle Gap Mountain, 1909 ¹	31 18 52.12 102 18 11.99	136 56 59 154 50 24	316 46 54 334 43 38	Curtis..... Douro.....	4.650459 4.683117	44,715.6 48,207.8	146,704 158,162
Judkin schoolhouse, cupola, 1909 ¹	31 42 54.28 102 37 39.67	274 26 55 358 45 41	94 30 20 178 45 46	Douro..... Curtis.....	4.012108 4.071435	10,282.6 11,787.9	33,735 38,674
Windmill 2 miles south of station Dublin, 1909.....	31 50 10.470 102 38 21.512	169 58 35.2 321 25 00.7	349 58 23.9 141 28 47.7	Dublin..... Douro.....	3.507562 4.260188	3,217.8 18,204.9	10,557 59,727

¹ No check on this position.² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
	° ' "	° ' "	° ' "				
Barstow latitude station, 1914 ¹	31 27 41.34 103 23 36.59						
Barstow courthouse, cupola, 1909.....	31 27 41.312 103 23 37.669	234 37 05.6 40 32 59.1	54 39 00.1 220 29 41.0	Hays..... Sist.....	3.851118 4.188940	7,097.7 15,450.4	23,286 50,690
Pecos courthouse, cupola, 1909 ¹	31 25 26.81 103 29 37.44	4 01 41 154 28 48	184 01 30 334 25 47	Sist..... Ingle.....	3.882017 4.326908	7,621.1 21,227.9	25,004 69,645
Davis, 1909 ¹	30 54 33.61 104 03 46.36	194 48 03 224 27 05	14 53 32 44 34 51	Round..... Toyah.....	4.817271 4.533940	65,655.5 34,193.2	215,405 112,182
Flat Top, 1909 ¹	31 10 26.95 104 03 48.66	122 31 28 281 39 06	302 25 58 101 46 55	Seay..... Toyah.....	4.300327 4.389372	19,967.7 24,511.6	65,511 80,418
Gomez Peak, 1909.....	31 01 34.347 104 04 16.791	8 15 00.8 122 02 11.6	188 14 53.2 301 52 58.0	Newman..... Reynolds.....	3.435104 4.524661	2,723.4 33,470.4	8,935 109,811
Newman (U.S.G.S.), 1909.....	31 00 00.218 104 04 42.758	126 43 13 235 39 57	306 34 14 55 40 03	Reynolds..... Newman.....	4.538318 2.557532	34,539.7 361.0	113,319 1,184
High or Sawtooth Mountain, 1909.....	30 41 05.893 104 13 39.621	166 22 13.2 202 28 34.2	346 17 51.7 22 33 15.2	Reynolds..... Newman.....	4.757135 4.580178	57,165.6 38,034.5	187,551 124,785
West, 1911.....	31 09 20.456 104 24 38.914	162 35 41.1 229 50 47.7	342 35 10.0 49 52 05.6	Krouse..... Reynolds.....	3.725784 3.717265	5,318.4 5,215.1	17,449 17,110
East, 1911.....	31 09 45.688 104 21 34.276	80 59 03.1 160 44 59.1	260 57 27.6 340 44 41.5	West..... Reynolds.....	3.694740 3.437468	4,951.5 2,738.2	16,245 8,984
Boracho, 1911.....	31 04 33.923 104 23 23.706	167 16 46.7 196 47 45.5	347 16 07.8 16 48 42.0	West..... East.....	3.956478 4.001281	9,046.4 10,029.5	29,680 32,905
Mid, 1911.....	31 07 10.145 104 22 51.577	203 08 25.4 10 02 20.0	23 09 05.4 190 02 03.5	East..... Boracho.....	3.716797 3.688942	5,209.5 4,885.9	17,092 16,030
Boracho longitude station, 1911 ¹	31 04 33.71 104 23 23.71	180 00 00	0 00 00	Boracho.....	0.817235	6,565	21.54

Boracho section house, 1909 ¹	31 04 37.64 104 23 19.02	105 05 58 164 57 08	284 49 40 344 55 55	Diablo..... Krouse.....	4.714811 4.154562	51,857.4 14,274.5	170,135 46,832
Cone, 1909 ¹	31 20 27.75 104 22 59.75	355 28 28 15 14 23	175 28 55 195 13 01	Reynolds..... Krouse.....	4.236593 4.205179	17,242.2 16,039.1	56,569 52,622
Pinnacle, 1909 ¹	31 44 24.39 104 22 36.49	350 18 20 4 37 32	179 18 35 184 35 57	Reynolds..... Krouse.....	4.788448 4.777546	61,439.5 59,916.4	201,573 196,576
Krouse (U.S.G.S.), cairn, 1909 ¹	31 12 05.19 104 25 39.15	248 42 18	68 42 18	Krouse.....	0.619093	4.16	13.6
Cone Peak, 1909 ¹	31 53 31.09 104 51 45.11	284 50 55 294 20 15	105 31 05 115 03 08	Ingle..... Sist.....	5.096671 5.153371	124,931.2 142,354.4	409,878 467,041
Diablo (U.S.G.S.), cairn, 1909 ¹	31 11 52.46 104 54 50.04	76 33 46	256 33 46	Diablo.....	0.515874	3.28	10.8
Allamore latitude station, 1914 ¹	31 04 39.47 105 00 08.17						
Allamore, 1909.....	31 04 39.201 105 00 08.562	24 28 50.7 99 45 08.3	204 26 17.6 279 29 47.8	Eagle..... Quitman.....	4.279670 4.679166	19,040.1 47,771.2	62,467 156,729
Allamore tank, 1909.....	31 04 38.930 105 00 08.444	24 29 58.6 99 45 39.5	204 27 25.5 279 30 21.0	Eagle..... Quitman.....	4.279527 4.679207	19,033.9 47,775.7	62,447 156,744
Quitman (U.S.G.S.), cairn, 1909 ¹	31 08 58.59 105 29 45.97	30 57 40	210 57 40	Quitman.....	0.301030	2.0	7
Corduna (U.S.G.S.), cairn (N. Mex.), 1909 ¹	32 01 31.397 105 30 55.970	350 47 45	170 47 45	Corduna.....	0.892095	7.8	26
Cerro Alto (U.S.G.S.), 1909 ¹	31 56 43.04 105 58 13.05	338 49 58	158 49 58	Cerro Alto.....	0.845098	7.0	23
South Guard Mountain, 1918.....	31 53 31.61 104 51 38.55	322 41 40 334 38 58	143 06 15 155 00 22	Newman..... Baldy.....	5.092543 5.187363	123,749.4 153,944.1	406,001 505,065
Mesa, 1909.....	31 45 34.993 106 20 18.573	137 21 06.5 239 21 13.2	317 16 13.0 59 32 52.8	North Franklin..... Cerro Alto.....	4.334153 4.607118	21,585.0 40,468.6	70,817 132,771
United States and Mexico boundary monument no. 2 eccentric, 1909.....	31 47 01.336 106 32 11.977	197 19 58.4 278 00 39.6	17 21 19.2 98 06 55.2	North Franklin..... Mesa.....	4.141002 4.277828	13,835.7 19,959.6	45,393 62,203
United States and Mexico boundary monument no. 3, 1893.....	31 47 01.613 106 34 54.187	212 25 08.7 270 06 09.0	32 27 57.0 90 07 34.4	North Franklin..... United States and Mexico boundary monument no. 2 eccentric.....	4.194206 3.630200	15,638.9 4,267.8	51,309 14,002

¹ No check on this position.² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
United States and Mexico boundary monument no. 2, 1893.	31 47 01.610	329 51 52.9	149 51 53.0	United States and Mexico boundary monument no. 2 eccentric.	0.988996	9.75	32.0	
	106 32 12.163	90 00 46.8	269 59 21.5	United States and Mexico boundary monument no. 3.	3.629700	4,262.8	13,986	
El Paso, Federal building tower, center, 1910.	31 45 32.007	120 40 10.1	300 38 37.2	United States and Mexico boundary monument no. 2 eccentric.	3.732064	5,395.9	17,703	
	106 29 15.575	269 35 16.6	89 39 59.2	Mesa.	4.150221	14,132.6	46,367	
El Paso, Federal building flagstaff, 1893.	31 45 32.020	120 40 44.0	300 39 11.2	United States and Mexico boundary monument no. 2 eccentric.	3.731878	5,393.6	17,696	
	106 29 15.667	269 35 22.7	89 40 05.4	Mesa.	4.150295	14,135.0	46,375	
Juarez water tower (Mexico), 1910 ¹ .	31 44 18.63	137 04 50	317 03 16	United States and Mexico boundary monument no. 2.	3.836082	6,856	22,493	
	106 29 14.71	260 29 52	80 34 34	Mesa.	4.155507	14,306	46,935	
Silo, 1909 ¹ .	31 44 59.57	122 26 25	302 24 26	United States and Mexico boundary monument no. 2.	3.845749	7,010	22,999	
	106 28 27.29	265 06 56	85 11 13	Mesa.	4.110868	12,908	42,349	
A, 1893.	31 47 00.630	90 25 13.3	270 23 48.4	United States and Mexico boundary monument no. 3.	3.627836	4,244.6	13,926	
	106 32 12.861	211 19 48.6	31 19 49.0	United States and Mexico boundary monument no. 2.	1.548196	35.3	11.6	
B, 1893.	31 47 13.643	294 16 41.7	114 16 58.2	United States and Mexico boundary monument no. 2.	2.954873	901.3	2,957	
	106 32 43.390	296 31 01.6	116 31 17.7	A.	2.953110	897.7	2,945	
El Paso north base, 1893.	31 47 17.739	64 29 17.2	244 28 55.1	A.	3.087542	1,223.3	4,013	
	106 31 30.898	86 13 16.6	266 12 38.4	B.	3.281340	1,911.3	6,271	
El Paso south base, 1893.	31 46 59.895	91 09 20.8	271 08 58.3	A.	3.051541	1,126.0	3,694	
	106 31 30.073	177 44 15.5	357 44 15.1	El Paso north base.	2.740885	550.0	1,804	
C, 1893.	31 46 39.365	105 40 15.5	285 39 28.8	A.	3.384836	2,425.7	7,958	
	106 30 44.092	133 49 33.8	313 49 09.2	El Paso north base.	3.232202	1,706.9	5,600	
El Paso courthouse dome, center, 1893.	31 45 29.860	119 22 06.4	299 20 25.9	United States and Mexico boundary monument no. 2.	3.760770	5,764.6	18,913	
	106 29 01.218	269 18 11.9	89 22 47.0	Mesa.	4.138473	13,755.4	45,129	
Juarez Cathedral, cross on top (Mexico), 1893.	31 44 18.157	136 15 48.0	316 14 12.2	A.	3.840570	6,927.4	22,728	
	106 29 10.832	150 34 09.9	330 33 20.8	C.	3.698440	4,993.9	16,384	
Juarez bell tower (Mexico), 1893.	31 44 19.129	135 56 39.0	315 55 02.7	A.	3.840295	6,923.0	22,713	
	106 29 09.891	150 09 08.2	330 08 18.6	C.	3.697242	4,980.1	16,339	
El Paso astronomical station no. 1, 1893.	31 47 01.612	180 58 11.1	0 58 11.3	El Paso north base.	2.696161	496.8	1,630	
	106 31 31.218	330 20 23.4	150 20 24.0	El Paso south base.	1.784405	60.9	200	
United States and Mexico boundary monument no. 1, 1893.	31 47 01.612	216 58 04.7	36 58 12.3	El Paso north base.	2.793573	621.7	2,040	
	106 31 45.109	277 36 52.6	97 37 00.6	El Paso south base.	2.601101	399.1	1,309	
El Paso magnetic station, 1893.	31 47 01.612	72 24 11.5	252 24 08.2	El Paso south base.	2.242894	174.9	574	
	106 31 23.735	90 00 07.8	270 00 03.9	El Paso astronomical station no. 1.	2.294195	196.9	646	
Weather, 1911 ¹ .	31 45 41.12	315 07 39	135 07 46	El Paso courthouse.	2.68975	489.5	1,606	
	106 29 14.34	6 35 46	186 35 46	El Paso Federal building tower, center.	2.45139	282.7	927	
Mills, 1911 ¹ .	31 45 32.18	200 41 50	20 41 52	Weather.	2.46877	294.3	966	
	106 29 18.29	274 27 29	94 27 31	El Paso Federal building tower, center.	1.85582	71.7	235	
East, 1911 ¹ .	31 45 38.60	254 51 21	74 51 26	Weather.	2.47292	297.1	975	
	106 29 25.24	317 14 27	137 14 30	Mills.	2.43013	269.2	883	
West, 1911 ¹ .	31 45 36.13	231 11 51	51 11 53	East.	2.08454	121.5	399	
	106 29 28.84	248 02 53	68 03 00	Weather.	2.61415	411.3	1,349	
El Paso Presbyterian Church, 1911 ¹ .	31 45 48.98	314 27 23	134 27 28	Weather.	2.53852	345.6	1,134	
	106 29 23.71	337 43 32	157 43 36	El Paso Federal building tower, center.	2.75209	565.1	1,854	
El Paso, city hall, 1911 ¹ .	31 45 31.92	90 26 07	270 26 01	El Paso Federal building tower, center.	2.51356	326.3	1,071	
	106 29 03.18	133 57 57	313 57 51	Weather.	2.61081	408.1	1,339	
El Paso longitude station, 1911 ¹ .	31 45 36.05	180 00	0 00	West.	0.3579	2.28	7.5	
	106 29 28.84							
Transit stake, 1892 ¹ .	31 45 35.78	98 55 05	278 55 03	El Paso west base 1.	1.980790	95.67	313.9	
	106 29 26.33	180 01 19	0 01 19	Meridian stake.	1.942744	87.65	287.6	
El Paso longitude station, 1892 ¹ .	31 45 35.49	180 00 00	0 00 00	Transit stake.	0.93852	8.68	28.5	
	106 29 26.33							
El Paso latitude station, 1892 ¹ .	31 45 35.49							
	106 29 26.38							
El Paso west base 2, 1892 ¹ .	31 45 38.63	305 57 43	125 57 49	El Paso Federal building flagstaff.	2.54002	346.8	1,138	
	106 29 26.33	350 39 05	170 39 13	Juarez Cathedral.	3.40001	2,511.9	8,241	

¹ No check on this position.

Texas-California arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
El Paso middle base, 1892 ¹	31 45 52.03	24 23 47	204 23 42	El Paso Federal building flagstaff.....	2.83052	676.9	2,221	
	106 29 05.04	53 36 57	233 36 46	El Paso west base 2.....	2.84255	695.9	2,283	
El Paso east base 2, 1892 ¹	31 46 07.24	13 12 09	193 11 53	Juarez Cathedral.....	3.53794	3,451.0	11,322	
	106 28 40.89	53 37 10	233 36 46	El Paso west base 2.....	3.17186	1,485.5	4,874	
Meridian stake, 1892 ¹	31 45 38.62	292 13 19	112 13 33	El Paso courthouse.....	2.85363	713.9	2,342	
	106 29 26.33	305 56 52	125 56 58	El Paso Federal building flagstaff.....	2.53983	346.6	1,137	
El Paso west base 1, 1892 ¹	31 45 36.26	232 23 53	52 23 55	Meridian stake.....	2.07679	119.3	391	
	106 29 29.92	289 12 06	109 12 14	El Paso Federal building flagstaff.....	2.59906	397.2	1,303	
El Paso east base 1, 1892 ¹	31 45 44.56	353 40 59	173 41 00	El Paso Federal building flagstaff.....	2.58980	388.9	1,276	
	106 29 17.29	52 24 59	232 24 54	Meridian stake.....	2.47724	300.1	985	
El Paso, Pierson Hotel, 1892 ¹	31 45 39.38	87 07 02	267 06 52	Meridian stake.....	2.66863	466.3	1,530	
	106 29 08.64	125 00 12	305 00 07	El Paso east base 1.....	2.44432	278.2	913	
El Paso city hall flagstaff, 1892 ¹	31 45 22.32	152 17 42	332 17 38	El Paso west base 1.....	2.68569	484.9	1,591	
	106 29 21.36	165 23 20	345 23 18	Meridian stake.....	2.71512	518.9	1,702	
El Paso, electric light pole in plaza, 1892 ¹	31 45 33.93	120 41 09	300 41 04	Meridian stake.....	2.45238	283.4	930	
	106 29 17.07	178 58 05	358 58 05	El Paso east base 1.....	2.51547	327.7	1,075	
Wheeler's latitude and longitude station (Fort Bliss), 1878. ¹	31 45 34.46	7 59 00	187 59 00	El Paso, electric light pole in plaza.....	1.21906	16.56	54.3	
	106 29 16.98							
Jarilla latitude and longitude station (N.Mex.), 1911. ¹	32 23 59.57	98 38 34	278 38 34	Jarilla.....	0.403120	2.53	8.3	
	106 06 44.52							
North Franklin (U.S.G.S.), cairn, 1909. ¹	31 54 10.23	354 04 49	174 04 49	North Franklin.....	0.462398	2.9	10	
	106 29 35.12							
Newman railroad water tank (N.Mex.), 1931 ¹	32 00 14.84	281 02 15	101 13 24	Cerro Alto.....	4.529261	33,826.8	110,980	
	106 19 17.07	55 21 30	235 16 02	North Franklin.....	4.295326	19,739.0	64,760	
El Paso, Nichols Copper Co., smokestack, 1931. ¹	31 45 46.35	147 27 51	327 24 32	North Franklin.....	4.265062	18,410.3	60,401	
	106 23 18.29	242 49 36	63 02 51	Cerro Alto.....	4.647788	44,441.4	145,805	

One-hundred-and-fourth meridian arc

Principal points											
Jurnegan (N.Mex.), 1922.....	32 12 18.047										
	104 23 02.127										
Loving (N.Mex.), 1922.....	32 15 52.954	75 34 04.81	255 25 23.51	Jurnegan.....	4.4221003	26,430.19	86,713.0				
	104 06 44.804										
Screwbean, 1922.....	31 51 02.389	153 50 46.27	333 44 15.38	Jurnegan.....	4.6414116	43,793.70	143,679.8				
	104 10 45.078	187 47 57.53	7 50 06.06	Loving.....	4.6659726	46,341.77	152,039.6				
Pope (N.Mex.), 1922.....	32 02 01.528	52 21 14.76	232 12 26.02	Screwbean.....	4.5209296	33,184.07	108,871.4				
	103 54 05.685	112 46 21.43	292 30 58.18	Jurnegan.....	4.6930427	49,322.23	161,818.0				
		142 12 56.55	322 06 12.60	Loving.....	4.5109223	32,428.16	106,391.4				
Welch (N.Mex.), 1922.....	32 02 59.593	133 49 00.67	313 42 56.32	Jurnegan.....	4.3956299	24,867.37	81,585.7				
	104 11 37.012	197 47 52.55	17 50 28.08	Loving.....	4.3983078	25,021.18	82,090.3				
		273 37 56.52	93 47 14.29	Pope.....	4.4415588	27,641.32	90,686.6				
		356 27 46.72	176 28 14.21	Screwbean.....	4.3450287	22,132.41	72,612.7				
Devine, 1922.....	31 42 55.770	110 33 10.03	290 19 45.01	Screwbean.....	4.6326089	42,914.98	140,796.9				
	103 45 16.674	158 32 00.54	338 27 21.19	Pope.....	4.5789852	37,930.21	124,442.7				
		310 05 04.81	130 10 15.68	Ingle.....	4.3098336	20,409.56	66,960.4				
Snyder, 1922.....	31 34 04.851	140 43 45.88	320 35 13.08	Screwbean.....	4.6077011	40,522.95	132,949.0				
	103 54 29.453	221 39 13.33	41 44 03.32	Devine.....	4.3404149	21,898.53	71,845.4				
		263 52 14.23	84 02 13.96	Ingle.....	4.4823244	30,361.58	99,611.3				
		347 46 25.31	167 47 06.38	Round.....	3.9905919	9,785.70	32,105.3				
Ross, 1922.....	31 43 32.390	343 19 56.58	163 21 40.70	Snyder.....	4.2611438	18,245.00	59,858.8				
	103 57 47.892	124 11 17.14	304 04 27.74	Screwbean.....	4.3927266	24,701.69	81,042.1				
		189 41 06.27	9 43 03.63	Pope.....	4.5397953	34,657.34	113,705.0				
		273 12 32.93	93 19 07.91	Devine.....	4.2968881	19,810.16	64,993.8				
Carruthers, 1922.....	31 34 13.185	87 13 14.70	267 11 30.29	Snyder.....	3.7214549	5,265.69	17,275.9				
	103 51 10.011	210 01 18.80	30 04 24.06	Devine.....	4.2693734	18,594.03	61,003.9				
		263 12 12.54	83 20 27.72	Ingle.....	4.3997878	25,106.60	82,370.6				
		18 00 23.44	197 59 20.21	Round.....	4.0139264	10,325.86	33,877.4				
Supplementary points											
Mile corner 53 eccentric (Tex.-N.Mex.), 1922.....	31 59 46.036	236 55 41.91	56 57 51.45	Pope.....	3.8837439	7,651.45	25,103.1				
	103 58 10.048	50 56 22.80	230 49 43.55	Screwbean.....	4.4076415	25,564.75	83,873.7				
		105 46 58.31	285 39 50.40	Welch.....	4.3424160	21,999.66	72,177.2				
Mile corner 61 eccentric (Tex.-N.Mex.), 1922.....	31 59 49.861	22 19 01.1	202 16 47.0	Screwbean.....	4.244512	17,559.5	57,610				
	104 06 31.461	126 06 29.4	306 03 47.4	Welch.....	3.996595	9,921.9	32,552				

¹ No check on this position.

One-hundred-and-fourth meridian arc—Continued

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Mile corner 53 (Tex.-N.Mex.), 1922 ¹	° ' '' 31 59 59.93 103 58 02.53	° ' '' 24 46 00	° ' '' 204 45 56	Mile corner 53 eccentric.....	2.673181	471.174	1,545.84
Mile corner 61 (Tex.-N.Mex.), 1922 ¹	° ' '' 31 59 59.40 104 06 13.18	° ' '' 58 32 00	° ' '' 238 31 51	Mile corner 61 eccentric.....	2.750184	562.58	1,845.7

Rio Grande arc

<i>Principal points</i>							
Handy, 1917.....	26 05 37.024 98 05 55.362	215 16 04.78 278 12 02.16	35 17 28.84 98 16 04.67	Donna..... Rio.....	3.9629288 4.189977	9,181.82 15,488.09	30,124.0 50,813.8
San Juan, 1917.....	26 11 18.456 98 06 35.570	295 07 32.45 307 42 24.29 353 55 47.68	115 09 14.39 127 46 44.92 173 56 05.40	Donna..... Rio..... Handy.....	3.8505892 4.3178337 4.0239249	7,069.07 20,789.00 10,566.35	23,258.1 68,205.2 34,666.4
Hickley, 1917.....	26 08 48.180 98 16 14.142	253 54 28.43 288 51 07.97	73 58 43.58 108 55 40.40	San Juan..... Handy.....	4.2232375 4.2593539	16,720.05 18,169.96	54,855.7 59,612.6
McAllen, 1917.....	26 14 02.079 98 14 22.935	291 10 56.02 317 45 43.18 17 43 59.82	111 14 22.45 137 49 27.00 197 43 10.74	San Juan..... Handy..... Hickley.....	4.1435579 4.3218644 4.0060985	13,917.39 20,982.85 10,141.41	45,660.6 68,841.2 33,272.3
Mamie, 1917.....	26 13 03.054 98 22 39.801	262 27 59.96 306 11 46.36	82 31 39.52 126 14 36.52	McAllen..... Hickley.....	4.1433563 4.1230056	13,910.93 13,274.12	45,639.4 43,550.2
Mission, 1917.....	26 17 40.111 98 20 50.048	301 58 00.65 334 54 35.03 19 39 51.10	122 00 51.95 154 56 36.93 199 39 02.55	McAllen..... Hickley..... Mamie.....	4.1026130 4.2570247 3.9568346	12,665.23 18,072.77 9,053.88	41,552.5 59,293.7 29,704.3
Pedro, 1917.....	26 14 36.859 98 28 58.791	247 23 24.05 285 19 19.76	67 27 00.36 105 22 07.27	Mission..... Mamie.....	4.1669380 4.0377586	14,687.17 10,908.34	48,186.2 35,788.4
Palo, 1917.....	26 19 39.071 98 27 47.322	287 31 35.96 324 59 01.91 12 02 21.46	107 34 40.91 145 01 18.03 192 01 49.81	Mission..... Mamie..... Pedro.....	4.0841926 4.1725228 3.9781531	12,139.27 14,877.25 9,509.40	39,826.9 48,809.8 31,198.8

Fordyce, 1917.....	26 17 47.548 98 34 44.311	253 26 48.33 301 26 58.42	73 29 53.17 121 29 31.35	Palo..... Pedro.....	4.0815103 4.0507894	12,064.53 11,240.60	39,581.7 36,878.5
Eltoro, 1917.....	26 21 52.072 98 33 59.383	291 37 00.87 328 04 37.18 9 24 14.99	111 39 45.99 148 06 50.38 189 23 55.06	Palo..... Pedro..... Fordyce.....	4.0452897 4.1980200 3.8823865	11,099.15 15,776.84 7,627.58	36,414.5 51,761.2 25,024.8
Garcia, 1917.....	26 20 41.376 98 42 28.355	261 12 16.24 292 32 29.18	81 16 02.19 112 35 54.93	Eltoro..... Fordyce.....	4.1546964 4.1441930	14,278.95 13,937.76	46,846.9 45,727.5
Pancho, 1917.....	26 26 36.899 98 41 16.368	305 52 06.41 326 15 52.51 10 20 22.84	125 55 20.74 146 18 46.65 190 19 50.84	Eltoro..... Fordyce..... Garcia.....	4.1746516 4.2918953 4.0461674	14,950.36 19,583.73 11,121.60	49,049.6 64,251.0 36,488.1
Monument, 1917.....	26 21 16.784 98 46 02.041	218 46 18.63 280 24 27.28	38 48 25.64 100 26 02.12	Pancho..... Garcia.....	4.1017112 3.7799199	12,638.96 6,024.48	41,466.3 19,765.3
Corpus, 1917.....	26 26 28.548 98 45 56.076	268 05 00.07 331 40 02.75 0 59 15.15	88 07 04.62 151 41 35.09 180 59 12.50	Pancho..... Garcia..... Monument.....	3.8895176 4.0641029 3.9820860	7,753.85 12,136.76 9,595.91	25,439.1 39,818.7 31,482.6
Grande, 1917.....	26 23 30.323 98 49 30.368	227 15 39.25 305 25 19.18	47 17 14.58 125 26 51.72	Corpus..... Monument.....	3.9076211 3.8505412	8,083.90 7,088.29	26,521.9 23,255.5
Hebron, 1917.....	26 27 00.631 98 53 02.903	274 44 47.04 312 11 16.61 317 41 07.13	94 47 57.13 132 14 23.76 137 42 41.71	Corpus..... Monument..... Grande.....	4.0743215 4.1972555 3.9420478	11,866.47 15,749.09 8,750.80	38,931.9 51,670.1 28,709.9
Ringgold, 1917.....	26 22 30.848 98 53 29.440	185 03 36.75 254 32 44.17 280 23 04.87	5 03 48.55 74 34 30.41 100 26 23.55	Hebron..... Grande..... Monument.....	3.9209080 3.8372845 4.1007694	8,335.05 6,875.19 12,611.58	27,345.9 22,556.4 41,376.5
Garcena, 1917.....	26 26 56.437 98 55 42.997	268 19 22.88 335 37 42.96	88 20 34.18 155 38 42.37	Hebron..... Ringgold.....	3.6471054 3.9529115	4,437.16 8,972.46	14,557.6 29,437.1
Gorgora, 1917.....	26 25 23.665 99 00 34.622	250 31 17.88 256 33 41.68 294 15 49.18	70 33 27.71 76 37 02.78 114 18 58.22	Garcena..... Hebron..... Ringgold.....	3.9329688 4.1094893 4.1115653	8,569.76 12,866.76 12,929.01	28,116.0 42,213.7 42,417.9
Roma, 1917.....	26 28 12.772 99 01 40.668	283 18 58.95 340 37 27.54	103 21 38.31 160 37 56.95	Garcena..... Gorgora.....	4.0078697 3.7416704	10,182.86 5,516.59	33,408.3 18,099.0
Chingos, 1917.....	26 31 27.448 98 56 40.021	349 16 27.16 30 08 46.77 54 16 48.08	169 16 52.59 210 07 02.19 234 14 33.95	Garcena..... Gorgora..... Roma.....	3.9288377 4.1120902 4.0110352	8,488.63 12,044.65 10,257.35	27,849.8 42,469.2 33,652.7
Margo, 1917.....	26 33 23.474 99 01 22.884	294 29 46.08 2 56 56.97	114 31 52.47 182 56 49.03	Chingos..... Roma.....	3.9348064 3.9811222	8,606.10 9,574.63	28,235.2 13,142.8

¹ No check on this position.

Rio Grande arc—Continued

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U. S. COAST AND GEODETIC SURVEY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Banchez, 1917.....	° ' '' 26 32 16.435 98 56 50.661	° ' '' 348 56 38.50 46 58 46.63 105 19 44.84	° ' '' 168 56 43.25 226 56 37.21 285 17 43.17	Chinges..... Roma..... Margo.....	3.1864171 4.0408959 3.8928030	1,536.09 10,987.42 7,812.73	5,039.7 36,047.9 25,632.3
Labra, 1917.....	26 34 42.018 99 07 40.547	282 59 53.26 320 13 31.91	103 02 42.17 140 16 12.62	Margo..... Roma.....	4.0305223 4.1926041	10,728.09 15,581.32	35,917.1 51,119.7
Burros, 1917.....	26 37 43.495 99 03 00.536	341 20 10.74 352 49 15.86 54 13 43.54	161 20 54.45 172 49 51.55 234 11 38.14	Margo..... Roma..... Labra.....	3.9266613 4.2480438 3.9800252	8,446.20 17,702.87 9,550.48	27,710.6 58,080.2 31,333.5
Flores, 1917.....	26 38 24.821 99 03 46.312	315 07 29.56 43 23 49.76	135 07 50.08 223 22 04.84	Burros..... Labra.....	3.2539774 3.9747241	1,794.64 9,434.61	5,887.9 30,953.4
Roleta, 1917.....	26 45 41.989 99 11 39.412	315 43 11.75 315 46 56.97 341 58 16.78	135 47 04.85 135 50 29.55 162 00 03.99	Burros..... Flores..... Labra.....	4.3129770 4.2733093 4.3295649	20,557.82 18,763.30 21,358.21	67,446.8 61,559.3 70,072.7
Presa, 1917.....	26 42 31.528 99 01 07.967	19 21 19.75 29 58 46.78 108 36 24.93	199 20 29.23 209 57 35.70 288 31 40.87	Burros..... Flores..... Roleta.....	3.9729033 3.9427327 4.2650193	9,395.14 8,764.61 18,408.54	30,823.9 28,755.2 60,395.4
Evanito, 1917.....	26 49 58.274 99 08 28.519	318 27 23.50 33 46 23.89	138 30 41.93 213 44 57.83	Presa..... Roleta.....	4.2639300 3.9771556	18,362.42 9,487.58	60,244.0 31,127.2
Ale, 1917.....	26 46 31.742 99 10 17.642	55 52 31.73 205 21 39.90 295 55 05.17	235 51 54.90 25 22 29.10 115 59 12.50	Roleta..... Evanito..... Presa.....	3.4360269 3.8472440 4.2277128	2,729.15 7,034.67 16,893.23	8,953.9 23,079.6 55,423.9
Rafael, 1917.....	26 50 35.683 99 14 37.603	276 25 21.64 331 25 16.94	96 28 08.27 151 26 37.29	Evanito..... Roleta.....	4.0109571 4.0124958	10,255.51 10,291.91	33,646.6 33,766.0
Humaran, 1917.....	26 53 33.554 99 09 46.682	341 57 24.91 12 06 45.48 55 44 09.95	161 58 00.22 192 06 54.60 235 41 58.47	Evanito..... Roleta..... Rafael.....	3.8431155 4.1715306 3.9876141	6,968.12 14,843.30 9,718.83	22,861.2 48,698.4 31,885.9
Zapata, 1917.....	26 52 49.472 99 17 48.790	264 08 51.49 307 56 55.99	84 12 29.51 127 58 22.37	Humaran..... Rafael.....	4.1262824 3.8256914	13,374.65 6,693.93	43,880.0 21,961.7

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Moleno, 1917.....	26 57 02.321 99 16 27.911	300 06 22.72 345 38 36.78 16 00 21.97	120 09 24.39 165 39 26.68 195 59 45.36	Humaran..... Rafael..... Zapata.....	4.1071970 4.0892960 3.9082490	12,799.62 12,282.76 8,095.62	41,993.4 40,297.7 26,560.4
Feora, 1917.....	26 58 31.433 99 21 28.334	288 17 45.30 330 03 55.55	108 20 01.52 150 05 34.98	Moleno..... Zapata.....	3.9409092 4.0843289	8,727.89 12,143.08	28,634.8 39,839.4
Loma, 1917.....	26 59 52.441 99 17 11.991	346 55 34.50 70 35 14.47	166 55 54.50 250 33 18.15	Moleno..... Feora.....	3.7303887 3.8747929	5,375.13 7,495.37	17,634.9 24,591.1
Urebeno, 1917.....	26 57 05.116 99 20 17.982	143 51 38.75 224 52 23.02 270 45 43.98 332 22 20.48	323 51 06.85 44 53 47.38 90 47 28.26 152 23 28.02	Feora..... Loma..... Moleno..... Zapata.....	3.5171626 3.8614361 3.8025470 3.9484032	3,289.75 7,268.36 6,346.69 8,879.80	10,793.1 23,846.3 20,822.4 29,133.1
Ygnacio, 1917.....	27 03 28.801 99 22 59.932	304 45 02.84 344 34 12.21	124 47 40.95 164 34 53.82	Loma..... Feora.....	4.0672900 3.9774586	11,675.89 9,494.20	38,306.6 31,148.9
Union, 1917.....	27 08 30.620 99 17 50.441	356 11 49.08 18 02 55.38 42 33 52.07	176 12 06.57 198 01 16.26 222 31 31.08	Loma..... Feora..... Ygnacio.....	4.2036729 4.2876786 4.1006666	15,983.54 19,394.50 12,608.59	52,439.3 63,630.1 41,366.7
Dan, 1917.....	27 10 59.929 99 18 58.008	337 57 28.62 25 39 02.60	157 57 59.47 205 37 12.32	Union..... Ygnacio.....	3.6952794 4.1875430	4,957.69 15,400.79	16,265.4 50,527.4
Dolores, 1917.....	27 16 46.855 99 26 00.788	312 31 21.45 318 30 27.90 348 31 46.73	132 34 34.91 138 34 12.13 168 33 09.32	Dan..... Union..... Ygnacio.....	4.1983922 4.3092169 4.3990199	15,790.37 20,380.60 25,062.24	51,805.6 66,865.4 82,225.0
George, 1917.....	27 21 00.664 99 18 32.776	2 09 04.17 57 38 43.45	182 08 52.61 237 35 17.87	Dan..... Dolores.....	4.2672387 4.1639367	18,502.85 14,586.02	60,704.8 47,854.3
Fort, 1917.....	27 26 45.293 99 25 10.478	314 07 34.30 340 35 12.18 4 17 45.57	134 10 37.31 160 38 03.10 184 17 22.45	George..... Dan..... Dolores.....	4.1826518 4.4892099 4.2664953	15,228.31 30,846.79 18,471.21	49,961.5 101,203.2 60,601.0
Casbeer, 1917.....	27 30 21.766 99 19 43.478	353 34 47.99 53 26 20.40	173 35 20.56 233 23 49.53	George..... Fort.....	4.2400298 4.0484400	17,379.20 11,179.95	57,018.3 36,679.6
Taylor, 1917.....	27 30 49.946 99 21 18.947	288 18 37.21 345 51 55.79 40 10 56.07	108 19 21.30 165 53 12.34 220 09 09.23	Casbeer..... George..... Fort.....	3.4409221 4.2719149 3.9936284	2,760.08 18,703.16 9,854.36	9,055.4 61,632.0 32,330.5
Laredo, 1917.....	27 30 37.042 99 29 16.609	268 14 02.33 316 32 04.32	88 17 42.98 136 33 57.89	Taylor..... Fort.....	4.1177880 3.9923578	13,115.60 9,825.57	43,030.1 32,236.1
Orvil, 1917.....	27 38 12.158 99 28 12.354	320 10 32.67 346 42 25.92 7 10 31.03	140 13 44.04 166 43 50.01 187 10 01.28	Taylor..... Fort..... Laredo.....	4.2483640 4.3369126 4.1498025	17,715.93 21,722.64 14,118.95	58,123.0 71,268.4 46,321.9

TRIANGULATION IN TEXAS

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Rio Grande arc—Continued

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>							
Knob, 1917.....	27 36 00.743	237 19 19.89	57 21 06.57	Orvil.....	3.8747661	7,494.91	24,589.6
	99 32 02.475	298 24 36.51	118 29 34.22	Taylor.....	4.3027609	20,079.87	65,878.7
		326 29 46.91	146 32 57.29	Fort.....	4.3116909	20,497.03	67,247.3
		335 26 33.37	155 27 50.09	Laredo.....	4.0395521	10,953.48	35,936.5
Fieldings, 1917.....	27 40 30.897	295 12 54.55	115 15 27.98	Orvil.....	4.0007028	10,016.20	32,861.5
	99 33 42.904	341 40 27.53	161 41 14.12	Knob.....	3.9424721	8,759.35	28,738.0
Davis, 1917.....	27 46 06.187	349 42 39.81	169 43 24.72	Orvil.....	4.1711141	14,829.08	48,651.7
	99 29 48.970	11 06 54.04	191 05 52.01	Knob.....	4.2785609	18,991.57	62,308.2
		31 51 07.55	211 49 18.72	Fieldings.....	4.0845084	12,148.10	39,855.9
Coleman, 1917.....	27 45 26.459	266 13 22.22	86 18 41.06	Davis.....	4.2737653	18,783.01	61,623.9
	99 41 13.456	306 21 51.39	126 25 20.93	Fieldings.....	4.1856325	15,333.19	50,305.6
Tordillo, 1917.....	27 43 26.828	148 55 02.41	328 54 24.68	Coleman.....	3.6334597	4,299.91	14,107.3
	99 39 52.390	253 25 44.50	73 30 25.43	Davis.....	4.2364988	17,238.47	56,556.5
		298 07 10.08	118 10 01.83	Fieldings.....	4.0599712	11,480.78	37,666.5
Tajone, 1917.....	27 49 18.476	3 05 12.64	183 05 07.20	Davis.....	3.7728685	5,927.46	19,447.0
	99 29 37.313	69 30 07.23	249 24 42.67	Coleman.....	4.3086055	20,351.92	66,771.3
Thomas, 1917.....	27 53 24.192	287 17 54.87	107 24 48.17	Tajone.....	4.4040560	25,354.56	83,184.1
	99 44 21.837	299 23 04.51	119 29 52.00	Davis.....	4.4382143	27,429.27	89,990.9
		340 40 02.80	160 41 30.73	Coleman.....	4.1926444	15,582.76	51,124.4
Brewster, 1917.....	28 01 05.217	330 43 20.82	150 46 49.44	Tajone.....	4.3967817	24,933.41	81,802.4
	99 37 02.847	40 14 44.52	220 11 18.74	Thomas.....	4.2691496	18,584.44	60,972.4
Willie, 1917.....	27 56 02.542	233 16 56.59	53 20 31.24	Brewster.....	4.1929658	15,594.30	51,162.3
	99 44 40.419	296 39 56.16	116 46 58.45	Tajone.....	4.4418201	27,657.96	90,741.2
		354 02 50.29	174 02 58.99	Thomas.....	3.6902558	4,900.67	16,078.3
Cup, 1917.....	28 03 34.873	286 44 41.33	106 49 04.24	Brewster.....	4.2029169	15,955.74	52,348.1
	99 46 22.141	348 42 15.32	168 43 03.07	Willie.....	4.1522375	14,198.34	46,582.4
Galvan, 1917.....	28 05 59.580	356 51 50.04	176 51 58.59	Brewster.....	3.9578336	9,074.73	29,772.7
	99 37 21.020	33 10 47.77	213 07 21.37	Willie.....	4.3414542	21,950.99	72,017.5
		73 15 26.92	253 11 12.21	Cup.....	4.1883991	15,431.18	50,627.1

U. S. COAST AND GEODETIC SURVEY

Cat, 1917.....	28 17 31.225	318 58 16.11	139 03 36.57	Galvan.....	4.4503088	28,203.88	92,532.2
	99 48 39.241	351 43 32.31	171 44 37.05	Cup.....	4.4152312	26,015.44	85,352.3
Twin, 1917.....	28 05 35.331	183 25 39.21	3 26 02.09	Cat.....	4.3439367	22,076.83	72,430.4
	99 49 27.679	267 47 50.96	87 53 33.19	Galvan.....	4.2977827	19,851.01	65,127.9
		306 11 23.22	126 12 50.54	Cup.....	3.7978170	6,277.94	20,596.9
Tom, 1918.....	28 12 56.587	232 13 48.79	52 16 58.46	Cat.....	4.1402323	13,811.23	45,312.3
	99 55 19.893	324 41 52.10	144 44 38.30	Twin.....	4.2211214	16,638.78	54,589.1
Big, 1917.....	28 11 48.528	188 56 05.43	8 56 11.14	Tom.....	3.3264956	2,120.78	6,957.9
	99 55 31.972	226 49 05.26	46 52 20.59	Cat.....	4.1881843	15,423.55	50,602.1
		319 06 25.73	139 09 17.58	Twin.....	4.1816031	15,191.58	49,841.0
Dentonio, 1918.....	28 18 32.418	278 39 27.86	98 43 02.38	Cat.....	4.0959100	12,471.25	40,916.1
	99 56 11.699	352 13 07.28	172 13 31.81	Tom.....	4.0184486	10,433.95	34,232.1
Carlow, 1918.....	28 22 46.775	306 50 46.01	126 54 31.65	Cat.....	4.2091589	16,186.72	53,105.9
	99 56 34.608	353 36 05.16	173 36 40.58	Tom.....	4.2620160	18,281.68	59,979.1
		355 26 32.48	175 26 43.36	Dentonio.....	3.8951371	7,854.84	25,770.4
Barr, 1918.....	28 18 12.425	229 56 28.68	49 59 23.89	Carlow.....	4.1182453	13,129.41	43,075.4
	100 02 43.694	308 45 37.09	128 49 07.21	Tom.....	4.1908844	15,519.74	50,917.7
English, 1918.....	28 23 25.183	279 41 24.72	99 43 25.41	Carlow.....	3.8458581	7,012.26	23,006.1
	100 00 48.483	335 08 58.39	155 11 34.19	Tom.....	4.3288092	21,321.08	69,950.9
		18 03 32.42	198 02 37.72	Barr.....	4.0054471	10,126.21	33,222.4
Glass, 1918.....	28 28 12.480	301 03 54.26	121 08 10.74	English.....	4.2335478	17,121.74	56,173.6
	100 09 47.201	327 59 59.86	148 03 21.21	Barr.....	4.3379592	21,775.05	71,440.3
Farland, 1918.....	28 25 23.678	240 27 48.62	60 30 29.31	Glass.....	4.0231740	10,548.09	34,606.5
	100 15 24.555	278 38 20.39	98 45 17.16	English.....	4.3824497	24,124.02	79,146.9
		302 35 56.66	122 41 58.12	Barr.....	4.3910634	24,607.27	80,732.4
Mack, 1918.....	28 26 24.791	251 33 39.35	71 36 33.72	Glass.....	4.0209564	10,494.37	34,430.3
	100 15 53.165	337 30 54.82	157 31 08.45	Farland.....	3.3087850	2,036.03	6,679.9
Indio, 1918.....	28 21 23.704	154 02 17.99	334 01 15.15	Farland.....	3.9147156	8,217.04	26,958.7
	100 13 12.382	203 55 05.63	23 56 43.26	Glass.....	4.1388481	13,767.28	45,168.2
		259 29 26.34	79 35 19.86	English.....	4.3138159	20,597.56	67,577.2
		288 55 59.78	109 00 58.13	Barr.....	4.2578995	18,109.21	59,413.3
Kennedy, 1918.....	28 33 01.950	325 23 16.76	145 25 04.65	Glass.....	4.0344449	10,825.42	35,516.4
	100 13 33.236	12 07 14.06	192 06 20.97	Farland.....	4.1592296	14,428.78	47,338.4
		17 17 56.87	197 16 50.11	Mack.....	4.1073743	12,804.84	42,010.5
Silo, 1918.....	28 33 15.381	271 41 47.20	91 45 47.93	Kennedy.....	4.1366158	13,696.69	44,936.6
	100 21 56.883	321 55 43.52	141 58 37.06	Mack.....	4.2054841	16,050.34	52,658.5
Davidson, 1918.....	28 38 11.117	330 34 03.49	150 35 38.03	Kennedy.....	4.0384847	10,926.59	35,848.3
	100 16 50.759	355 52 38.77	175 53 06.29	Mack.....	4.3384592	21,800.14	71,522.6
		42 26 11.11	222 23 44.59	Silo.....	4.0910252	12,331.76	40,458.4

TRIANGULATION IN TEXAS

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>							
Eagle, 1918.....	28 43 37.382	300 56 02.77	121 00 58.57	Davidson.....	4.2903848	19,515.73	64,027.9
	100 27 07.075	336 13 51.23	156 16 19.91	Silo.....	4.3205545	20,919.65	68,633.9
Lone, 1918.....	28 45 59.277	324 21 27.33	144 24 30.00	Davidson.....	4.2486839	17,728.99	58,165.9
	100 23 11.124	55 42 31.41	235 40 37.93	Eagle.....	3.8893182	7,750.29	25,427.4
Pass, 1918.....	28 42 50.760	198 42 04.21	18 42 12.81	Eagle.....	3.1804948	1,515.29	4,971.4
	100 27 24.978	229 52 03.09	49 54 05.15	Lone.....	3.9545851	9,007.10	29,550.8
		296 31 12.12	116 36 16.45	Davidson.....	4.2844706	19,251.77	63,161.8
		333 16 14.32	153 18 51.55	Silo.....	4.2972876	19,828.40	65,053.7
Laplace, 1918.....	28 42 46.327	248 19 27.05	68 20 37.10	Eagle.....	3.6291279	4,257.24	13,967.3
	100 29 32.858	267 44 22.39	87 45 23.82	Pass.....	3.5407652	3,473.48	11,395.9
		324 47 58.50	144 51 37.00	Silo.....	4.3324725	21,501.68	70,543.4
Nine, 1918.....	28 49 22.225	295 38 08.51	115 41 59.42	Lone.....	4.1590931	14,424.25	47,323.6
	100 31 10.503	328 06 10.30	148 08 07.48	Eagle.....	4.0969846	12,502.15	41,017.5
		347 43 54.63	167 44 41.63	Laplace.....	4.0959521	12,472.46	40,920.1
Paloma, 1918.....	28 53 28.702	354 48 02.18	174 48 24.57	Lone.....	4.1427961	13,893.00	45,580.6
	100 23 57.535	15 46 43.95	195 45 12.62	Eagle.....	4.2768253	18,915.83	62,059.7
		57 08 32.02	237 05 03.06	Nine.....	4.1453431	13,974.72	45,848.7
Burr, 1918.....	28 52 35.251	259 39 42.08	79 42 23.24	Paloma.....	3.9632727	9,189.09	30,147.9
	100 29 31.171	24 22 54.53	204 22 06.60	Nine.....	3.8145137	6,524.00	21,404.2
Pen, 1918.....	28 56 27.726	303 31 00.68	123 33 29.10	Paloma.....	3.9989484	9,975.82	32,729.0
	100 29 04.493	5 46 04.92	185 45 52.02	Burr.....	3.8569344	7,193.40	23,600.3
Wifp, 1918.....	28 56 48.213	274 28 37.21	94 31 00.53	Pen.....	3.9054875	8,044.29	26,392.0
	100 34 00.618	316 50 09.93	136 52 20.20	Burr.....	4.0283161	10,673.73	35,018.7
		341 25 49.31	161 27 11.49	Nine.....	4.1608677	14,483.31	47,517.3
White, 1918.....	29 00 03.523	334 30 36.72	154 31 33.37	Pen.....	3.8668513	7,359.55	24,145.5
	100 31 01.440	38 54 27.29	218 53 00.49	Wifp.....	3.8879416	7,725.77	25,347.0
Lake, 1918.....	29 00 00.029	263 43 01.95	83 43 19.46	White.....	2.9927474	983.44	3,226.5
	100 31 37.556	327 36 48.20	147 38 02.34	Pen.....	3.8886895	7,739.08	25,390.6
		33 16 12.73	213 15 03.42	Wifp.....	3.8489412	7,062.22	23,170.0

Towne, 1918.....	29 02 50.687	298 56 27.48	118 59 14.19	White.....	4.0264253	10,627.36	34,866.6
	100 36 45.044	338 14 44.27	158 16 03.98	Wifp.....	4.0796912	12,014.10	39,416.3
Jamerson, 1918.....	29 06 31.403	340 44 06.34	160 45 21.22	White.....	4.1020615	12,649.15	41,499.8
	100 33 35.630	2 09 30.42	182 09 18.29	Wifp.....	4.2544812	17,967.23	58,947.5
		37 01 33.43	217 00 01.37	Towne.....	3.9299273	8,509.95	27,919.7
Peters, 1918.....	29 10 32.792	331 55 20.57	151 56 31.97	Jamerson.....	3.9254254	8,422.20	27,631.8
	100 36 02.238	4 39 13.55	184 38 52.72	Towne.....	4.1545413	14,273.86	46,830.2
Dixie, 1918.....	29 08 48.207	250 36 52.82	70 39 38.03	Peters.....	3.9873022	9,711.86	31,863.0
	100 41 41.281	287 45 13.06	107 49 09.46	Jamerson.....	4.1394979	13,787.89	45,235.8
		323 56 00.31	143 58 24.37	Towne.....	4.1339667	13,613.40	44,663.3
Ross, 1918.....	29 17 43.868	330 24 35.59	150 26 51.79	Peters.....	4.1835389	15,259.45	50,063.7
	100 40 41.095	5 38 00.51	185 37 31.13	Dixie.....	4.2193648	16,571.61	54,368.7
Brackett, 1918.....	29 21 23.171	45 56 37.06	225 50 23.01	Peters.....	4.4589240	28,768.95	94,386.1
	100 23 17.094	52 08 04.48	231 59 04.92	Dixie.....	4.5775394	37,804.14	124,029.1
		76 35 30.69	256 26 59.36	Ross.....	4.4618984	28,966.66	95,034.8
Dobkins, 1918.....	29 20 59.152	268 51 12.66	89 03 30.03	Brackett.....	4.6083427	40,582.87	133,145.6
	100 48 21.340	295 48 09.32	115 51 54.71	Ross.....	4.1397081	13,794.43	45,267.1
		313 58 16.67	134 04 17.96	Peters.....	4.4432619	27,749.93	91,042.9
Hamilton, 1918.....	29 33 07.388	306 56 35.17	127 05 19.90	Brackett.....	4.5564726	36,014.10	118,156.3
	100 41 04.200	358 44 36.95	178 44 48.30	Ross.....	4.4539392	28,440.63	93,309.0
		27 44 51.06	207 41 16.13	Dobkins.....	4.4035963	25,327.73	83,096.1
Johnstone, 1918.....	29 22 38.398	49 03 55.97	229 02 51.94	Dobkins.....	3.6686472	4,662.80	15,297.9
	100 46 10.755	203 04 43.72	23 07 14.51	Hamilton.....	4.3233309	21,053.82	69,074.1
Moore, 1918.....	29 29 19.403	240 33 29.79	60 37 17.63	Hamilton.....	4.1551703	14,294.54	46,898.0
	100 48 46.594	357 28 02.72	177 28 15.13	Dobkins.....	4.1879995	15,416.99	50,580.6
Kelly, 1918.....	29 27 13.437	243 23 50.73	63 30 29.55	Hamilton.....	4.3870925	24,383.30	79,997.5
	100 54 34.024	247 28 17.41	67 31 08.34	Moore.....	4.0057165	10,132.50	33,243.0
		318 53 14.79	138 56 17.76	Dobkins.....	4.1843845	15,289.19	50,161.3
Mark, 1918.....	29 43 26.656	326 51 52.92	146 55 41.47	Hamilton.....	4.3572006	22,761.49	74,676.7
	100 48 46.346	0 00 52.78	180 00 52.66	Moore.....	4.4164142	26,086.40	85,585.1
		17 21 54.94	197 19 03.27	Kelly.....	4.4968134	31,391.59	102,990.6
Feely, 1918.....	29 32 37.803	237 26 09.34	57 35 46.11	Mark.....	4.5705220	37,196.21	122,041.1
	101 08 12.819	294 18 20.67	114 25 03.85	Kelly.....	4.3840063	24,210.75	79,431.4
McNutt, 1918.....	29 45 44.991	276 59 20.47	97 09 53.89	Mark.....	4.5387186	34,571.53	113,423.4
	101 10 03.119	323 47 23.04	143 55 02.07	Kelly.....	4.6271819	42,382.05	139,048.4
		353 00 51.88	173 01 46.45	Feely.....	4.3877111	24,418.06	80,111.6
Jim, 1918.....	29 46 14.365	278 41 30.99	98 51 48.52	Mark.....	4.5294070	33,838.18	111,017.4
	101 09 30.931	43 43 00.02	223 42 44.04	McNutt.....	3.0973647	1,251.31	4,105.3

Rio Grande arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Harrison, 1918.....	29 59 32.182	352 40 29.45	172 41 40.24	Mark.....	4.4767312	29,973.07	98,336.6
	100 51 08.538	50 22 09.61	230 13 00.39	Jim.....	4.5849151	38,451.66	126,153.5
		50 09 53.54	230 00 28.35	McNutt.....	4.5987377	39,695.17	130,233.2
Blue, 1918.....	30 03 20.698	278 27 00.40	98 41 32.14	Harrison.....	4.6740446	47,211.15	154,891.9
	101 20 10.746	331 26 54.53	151 32 13.60	Jim.....	4.5558404	35,961.72	117,984.4
		333 19 32.91	153 24 35.89	McNutt.....	4.5606737	36,364.18	119,304.8
Tippetts, 1918.....	29 51 14.903	214 57 20.59	35 02 11.94	Blue.....	4.4358534	27,280.57	89,503.0
	101 29 54.239	287 32 11.50	107 42 03.61	McNutt.....	4.5258236	33,560.12	110,105.2
Babb, 1918.....	30 01 31.861	262 19 57.55	82 27 46.73	Blue.....	4.4036654	25,331.76	83,109.3
	101 35 47.956	305 00 54.20	125 13 44.15	McNutt.....	4.7047992	50,675.64	166,258.3
		333 26 23.86	153 29 20.40	Tippetts.....	4.3270221	21,233.52	69,663.6
Proctor, 1918.....	29 53 04.218	217 01 56.88	37 05 36.72	Babb.....	4.2919941	19,588.18	64,265.6
	101 43 08.230	278 55 16.69	99 01 52.12	Tippetts.....	4.3339059	21,572.77	70,776.7
Ike, 1918.....	30 02 04.140	287 11 53.03	107 12 52.98	Babb.....	3.5263259	3,359.90	11,023.3
	101 37 47.741	327 32 36.90	147 36 33.26	Tippetts.....	4.3744290	23,682.58	77,698.6
		27 21 23.97	207 18 43.92	Proctor.....	4.2721753	18,714.38	61,398.8
Bassett, 1918.....	30 04 48.992	296 41 33.80	116 45 19.19	Babb.....	4.1302681	13,497.96	44,284.6
	101 43 18.013	299 49 21.17	119 52 06.59	Ike.....	4.0085893	10,199.74	33,463.6
		359 18 24.94	179 18 29.83	Proctor.....	4.3365074	21,702.38	71,201.9
Peggy, 1918.....	29 56 16.289	241 58 05.91	62 07 21.05	Bassett.....	4.5273307	33,676.79	110,487.9
	102 01 47.997	281 03 37.02	101 12 55.40	Proctor.....	4.4859428	30,615.60	100,444.7
Hoddy, 1918.....	30 05 54.692	282 50 31.84	102 53 17.67	Bassett.....	3.9583668	9,085.88	29,809.3
	101 48 48.797	338 55 48.15	158 58 38.38	Proctor.....	4.4051681	25,419.56	83,397.3
		49 35 31.26	229 29 01.44	Peggy.....	4.4384508	27,444.22	90,039.9
Eldridge, 1918.....	30 00 27.631	253 24 45.72	73 35 21.36	Hoddy.....	4.5497415	35,460.23	116,339.1
	102 09 58.028	300 28 03.60	120 32 08.41	Peggy.....	4.1832009	15,247.58	50,024.8
Hen, 1918.....	30 07 06.176	274 13 47.19	94 22 54.94	Hoddy.....	4.4761131	29,316.57	96,182.8
	102 07 00.708	337 15 29.31	157 18 05.80	Peggy.....	4.3363464	21,694.34	71,175.5
		21 10 13.13	201 08 44.30	Eldridge.....	4.1192184	13,158.86	43,172.0
Dryden west base, 1918.....	30 03 11.187	213 42 03.97	33 43 34.35	Hen.....	3.9394491	8,698.59	28,538.6
	102 10 01.001	359 05 37.22	179 05 38.71	Eldridge.....	3.7021511	5,036.76	16,524.8
Dryden east base, 1918.....	30 02 39.683	58 05 35.87	238 03 33.99	Eldridge.....	3.8858904	7,689.36	25,227.7
	102 05 54.464	98 22 23.10	278 20 19.65	Dryden west base.....	3.8244765	6,675.388	21,900.84
		167 48 18.90	347 47 45.70	Hen.....	3.9240386	8,395.35	27,543.7
Road, 1918.....	29 59 38.644	232 05 07.28	52 10 38.62	Hen.....	4.3511904	22,448.66	73,650.3
	102 18 02.272	263 20 14.08	83 24 16.20	Eldridge.....	4.1161459	13,066.10	42,867.7
Sanderson (U.S.G.S.), 1918.....	30 12 21.145	293 14 53.19	113 21 55.90	Hen.....	4.3893881	24,512.53	80,421.5
	102 21 02.018	320 58 31.85	141 04 04.91	Eldridge.....	4.4511999	28,261.81	92,722.3
		348 24 11.55	168 25 41.70	Road.....	4.3796119	23,966.90	78,631.4
New, 1918.....	30 03 58.303	231 55 47.89	52 01 59.37	Sanderson (U.S.G.S.).....	4.4003465	25,138.91	82,476.6
	102 33 21.950	287 54 43.32	108 02 23.58	Road.....	4.4134105	25,906.60	84,995.2
Dry, 1918.....	30 09 43.920	263 03 45.52	83 16 24.95	Sanderson (U.S.G.S.).....	4.6095708	40,697.79	133,522.7
	102 46 12.476	292 15 38.87	112 29 45.98	Road.....	4.6897743	48,952.44	160,604.8
		297 14 08.35	117 20 34.95	New.....	4.3657049	23,211.59	76,153.4
Pyle, 1918.....	30 21 49.219	299 20 12.99	119 29 58.34	Sanderson (U.S.G.S.).....	4.5516083	35,612.98	116,840.3
	102 40 22.747	22 44 18.18	202 41 21.92	Dry.....	4.3840214	24,211.48	79,433.8
Brown, 1918.....	30 09 16.570	229 09 58.41	49 18 25.18	Pyle.....	4.5501649	35,494.81	116,452.6
	102 57 08.426	264 14 53.96	84 33 03.06	Sanderson (U.S.G.S.).....	4.7652018	58,237.37	191,067.1
		267 12 26.55	87 17 56.08	Dry.....	4.2448489	17,573.12	57,654.5
		284 17 33.46	104 29 29.08	New.....	4.5958018	39,427.74	129,355.8
		285 38 56.05	105 58 31.77	Road.....	4.8149563	65,306.48	214,259.7
Nation, 1918.....	30 24 03.215	278 19 28.31	98 28 17.75	Pyle.....	4.4510429	28,251.59	92,688.8
	102 57 49.554	357 41 29.52	177 41 50.26	Brown.....	4.4365472	27,324.18	89,646.1
Madera, 1917.....	30 35 33.373	317 42 31.57	137 49 49.63	Pyle.....	4.5349722	34,274.58	112,449.2
	102 54 46.411	12 57 19.21	192 55 46.27	Nation.....	4.3385846	21,806.43	71,543.3
Ord (U.S.G.S.), 1917.....	30 14 25.333	251 18 15.81	71 34 57.49	Nation.....	4.7475296	55,915.17	183,448.4
	103 30 53.712	279 48 44.45	100 05 43.14	Brown.....	4.7403814	55,002.37	180,453.6
Chancellor, 1917.....	30 41 25.238	303 09 25.75	123 14 42.66	Madera.....	4.2963979	19,787.82	64,920.5
	103 05 08.214	339 56 53.48	160 00 36.42	Nation.....	4.5334126	34,151.72	112,046.1
		39 40 58.98	219 27 55.38	Ord (U.S.G.S.).....	4.8110037	64,714.81	212,318.5
Beard, 1917.....	30 49 40.185	290 01 26.87	110 14 46.26	Chancellor.....	4.6461784	44,277.02	145,265.5
	103 31 11.270	359 35 13.16	179 35 22.08	Ord (U.S.G.S.).....	4.8137540	65,125.94	213,667.4
		110 06 38.25	289 49 30.59	Newman.....	4.7521245	56,509.90	185,399.6
Star, 1917.....	30 46 38.534	277 54 46.25	98 16 29.50	Chancellor.....	4.8358386	68,523.35	224,813.7
	103 47 38.346	335 42 06.45	155 50 36.47	Ord (U.S.G.S.).....	4.8147786	65,279.77	214,172.0
		132 50 28.16	312 41 48.00	Newman.....	4.5641593	36,657.20	120,266.2

Rio Grande arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Baldy, 1917.....	30 38 07.619 104 10 23.611	109 59 14.07 158 53 30.23 192 56 50.10 246 29 14.85 251 00 51.12 304 32 17.92	289 42 48.09 338 45 39.87 12 59 50.48 66 40 52.01 71 20 53.21 124 52 18.53	Chispa..... Krouse..... Newman..... Star..... Beard..... Ord (U.S.G.S.).....	4.7371847 4.8279670 4.6200242 4.5975942 4.8202984 4.8860570	54,599.00 67,292.55 41,689.26 39,590.79 66,114.76 76,923.14	179,130.2 220,775.6 136,775.5 129,890.8 216,911.5 252,372.0
Supplementary points							
Donna sugar mill, taller of 2 stacks, 1917 ¹	26 08 17.24 98 03 29.81	39 22 05 137 14 19	219 21 01 317 12 57	Handy..... San Juan.....	3.804608 3.880646	6,376.9 7,597.1	20,922 24,925
San Juan standpipe, 1917.....	26 11 03.340 98 09 35.668	69 25 30.8 124 36 44.7	249 22 35.1 304 34 37.9	Hickley..... McAllen.....	4.072700 3.986231	11,822.2 9,687.9	38,787 31,784
Edinburg courthouse, cupola, 1917 ²	26 18 03.74 98 09 43.65	337 16 41 46 11 48	157 18 04 226 09 44	San Juan..... McAllen.....	4.130989 4.031027	13,520.4 10,740.6	44,358 35,238
Pharr, elevator east of railroad station, flag-pole, 1917.....	26 11 41.583 98 10 51.859	323 41 58.1 59 12 54.6	143 44 08.7 239 10 32.4	Handy..... Hickley.....	4.143554 4.017873	13,917.3 10,420.1	45,660 34,187
Pharr post office, pagoda cupola, 1917.....	26 11 37.332 98 11 00.927	274 29 30.3 322 32 52.7	94 31 27.4 142 35 07.3	San Juan..... Handy.....	3.868686 4.145001	7,390.7 13,963.7	24,248 45,813
Pharr standpipe, finial, 1917.....	26 11 33.404 98 11 05.075	59 22 35.8 129 48 20.4	239 20 19.5 309 46 53.0	Hickley..... McAllen.....	3.998960 3.854225	9,976.1 7,148.7	32,730 23,454
McAllen School, temporary scaffold, 1917.....	26 12 07.130 98 13 52.011	277 01 11.4 312 10 17.0	97 04 24.0 132 13 47.0	San Juan..... Handy.....	4.086713 4.252170	12,209.9 17,871.9	40,059 58,635
McAllen standpipe, 1917.....	26 12 17.967 98 14 08.657	311 58 24.3 28 21 58.6	132 02 01.7 208 21 03.3	Handy..... Hickley.....	4.265722 3.856482	18,438.3 7,336.4	60,493 24,070
McAllen Methodist Church, steeple, 1917 ¹	26 11 54.60 98 13 57.21	169 41 06 310 56 00	349 40 54 130 59 32	McAllen..... Handy.....	3.600714 4.248563	3,987.6 17,724.1	13,083 58,150
Tall stack south of station McAllen, 1917.....	26 10 08.630 98 13 34.883	60 46 24.9 169 28 58.9	240 45 14.7 349 28 37.7	Hickley..... McAllen.....	3.704917 3.863739	5,068.9 7,307.0	16,630 23,973
Edinburg, second lift pump, stack, 1917 ¹	26 12 24.91 98 15 57.74	221 20 38 3 54 28	41 21 20 183 54 21	McAllen..... Hickley.....	3.600258 3.825109	3,983.4 6,685.1	13,069 21,933
Mission, third lift pump, stack, 1917 ²	26 14 55.56 98 19 56.99	280 02 45 331 17 47	100 05 12 151 19 25	McAllen..... Hickley.....	3.973877 4.110185	9,416.2 12,888.0	30,893 42,283
Mission standpipe, 1917.....	26 12 46.955 98 19 35.465	255 03 31.3 322 43 24.6	75 05 49.4 142 44 53.4	McAllen..... Hickley.....	3.953180 3.965337	8,978.0 9,232.9	29,455 30,292
Mission, second lift pump, stack, 1917.....	26 12 43.012 98 19 50.743	255 00 32.3 320 12 59.3	75 02 57.2 140 14 34.9	McAllen..... Hickley.....	3.974008 3.973229	9,419.1 9,402.2	30,902 30,847
Pump station, tall metal stack, 1917 ¹	26 06 16.88 98 16 22.84	140 04 29 182 58 18	320 01 43 2 58 22	Mamie..... Hickley.....	4.212314 3.688612	16,304.7 4,662.4	53,493 15,297
Riogrande Pump Co., stack, 1917.....	26 05 47.311 98 15 41.396	139 06 47.5 188 08 22.7	319 03 43.0 8 08 57.2	Mamie..... McAllen.....	4.249055 4.186984	17,744.1 15,381.0	58,215 50,462
Hidalgo, church steeple near river, 1917.....	26 05 57.584 98 15 44.768	188 39 42.9 272 10 34.1	8 40 18.0 92 14 53.4	McAllen..... Handy.....	4.178459 4.214599	15,082.0 16,390.8	49,482 53,775
Derrick, 1917 ¹	26 09 55.06 98 20 04.86	143 22 27 287 47 30	323 21 19 107 49 12	Mamie..... Hickley.....	3.857915 3.828035	7,209.7 6,730.3	23,654 22,081
Mission, first lift pump, stack, 1917 ²	26 09 55.18 98 20 03.00	143 01 46 287 57 25	323 00 37 107 59 06	Mamie..... Hickley.....	3.859598 3.824928	7,237.7 6,682.3	23,746 21,924
Edinburg Pump Co., taller of 2 stacks, 1917 ¹	26 09 45.04 98 19 56.66	143 23 03 285 47 39	323 21 51 105 49 17	Mamie..... Hickley.....	3.880413 3.807749	7,593.0 6,423.2	24,911 21,073
Monastery, north end, east cupola, 1917 ²	26 09 15.39 98 19 31.21	143 14 11 278 41 04	323 12 48 98 42 31	Mamie..... Hickley.....	3.941855 3.743304	8,746.9 5,537.4	28,697 18,167
Metal stack southeast of station Mamie, 1917 ¹	26 10 05.46 98 22 06.32	170 20 58 283 38 38	350 20 43 103 41 13	Mamie..... Hickley.....	3.743806 4.002872	5,543.8 10,066.3	18,188 33,026
Banco, 1917.....	26 11 01.916 98 22 46.988	122 40 38.4 183 03 49.4	302 37 54.2 3 03 52.6	Pedro..... Mamie.....	4.088459 3.572088	12,259.1 3,733.3	40,220 12,248
Capatosa ranch, northeast windmill, 1917.....	26 16 36.764 98 25 47.084	55 15 55.7 149 16 34.1	235 14 30.9 329 15 40.9	Pedro..... Palo.....	3.811188 3.814712	6,474.2 6,527.0	21,241 21,414
Capatosa ranch, southwest windmill, 1917.....	26 16 36.722 98 25 47.472	55 13 12.2 149 21 47.5	235 11 47.6 329 20 54.5	Pedro..... Palo.....	3.810546 3.814418	6,464.7 6,522.6	21,210 21,400
Maximo Diaz ranch, windmill, 1917 ¹	26 18 33.29 98 34 24.76	21 04 10 186 33 39	201 04 01 6 33 50	Fordyce..... Eltoro.....	3.178588 3.789416	1,508.6 6,157.7	4,949 20,202
Flores ranch, windmill, 1917 ¹	26 18 02.62 98 33 50.95	72 36 21 178 06 15	252 35 58 358 06 11	Fordyce..... Eltoro.....	3.190647 3.849125	1,551.1 7,065.2	5,089 23,180

¹ No check on this position.
² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Windmill near white house, 1917 ¹	° ' '' 26 18 14.33	° ' '' 66 48 20	° ' '' 246 47 49	Fordyce.....	3.320663	2,092.5	6,865
	98 33 34.98	174 14 02	354 13 51	Eltoro.....	3.828334	6,734.9	22,096
Windmill near trees, 1917 ¹	26 20 34.24	37 58 17	217 57 13	Fordyce.....	3.813366	6,506.8	21,348
	98 32 20.00	131 00 04	310 59 20	Eltoro.....	3.562425	3,651.1	11,979
Eltoro ranch, windmill, 1917 ¹	26 21 50.34	13 11 27	193 10 59	Fordyce.....	3.885031	7,674.2	25,178
	98 33 41.18	96 01 56	276 01 48	Eltoro.....	2.705333	507.4	1,665
United States and Mexico boundary monu- ment, R. P. no. 4, 1917. ²	26 21 16.18	262 57 01	82 57 03	Monument.....	2.177767	150.58	494.0
	98 46 07.43						
Riogrande standpipe, 1917.....	26 22 28.759	212 18 48.9	32 20 03.8	Corpus.....	3.941151	8,732.8	28,651
	98 48 44.562	296 10 03.9	116 11 16.0	Monument.....	3.700774	5,020.8	16,472
Riogrande Methodist Church, steeple, 1917....	26 22 46.969	148 32 21.2	328 32 08.1	Grande.....	3.194288	1,564.2	5,132
	98 49 00.916	216 54 10.4	36 55 32.7	Corpus.....	3.930889	8,528.8	27,982
Riogrande, Starr County Courthouse, dome, 1917.	26 22 53.018	218 56 51.6	38 58 17.7	Corpus.....	3.930954	8,530.1	27,986
	98 49 09.610	299 39 02.6	119 40 25.9	Monument.....	3.770016	5,888.7	19,320
Riogrande Catholic Church, steeple, 1917.....	26 22 50.115	298 37 11.3	118 38 35.6	Monument.....	3.777725	5,994.1	19,666
	98 49 11.811	85 16 11.6	265 14 17.1	Ringgold.....	3.855300	7,166.4	23,512
Church steeple (Mexico), 1917.....	26 18 55.746	124 25 19.0	304 20 39.5	Gorgora.....	4.325099	21,139.7	69,356
	98 50 05.329	161 45 17.1	341 43 58.2	Hebron.....	4.196263	15,713.1	51,552
Mountain peak no. 1 (Mexico), 1917.....	26 03 52.067	222 47 41.8	43 06 56.2	Roleta.....	5.023407	105,537.5	346,251
	99 54 54.429	233 54 31.2	54 15 27.8	Labra.....	4.986993	97,049.4	318,403
Mountain peak no. 2 (Mexico), 1917.....	26 13 56.404	233 45 53.6	54 07 31.4	Roleta.....	4.998432	99,639.6	326,901
	100 00 08.240	246 05 04.5	66 28 24.4	Labra.....	4.979039	95,288.2	312,625
Mountain peak no. 3 (Mexico), 1917.....	26 07 08.609	242 02 05.4	62 38 28.2	Roleta.....	5.185666	153,343.7	503,095
	100 23 21.397	250 02 23.2	70 40 25.0	Labra.....	5.179996	151,355.4	496,572
Mountain peak no. 4 (Mexico), 1917.....	26 18 22.306	248 00 20.6	68 34 25.8	Roleta.....	5.134845	136,409.6	447,537
	100 27 57.276	256 58 18.1	77 34 03.1	Labra.....	5.136134	136,815.1	448,868

Roma Catholic Church, spire, 1917.....	26 24 21.543 99 01 01.467	171 19 27.1 241 36 12.3	351 19 09.6 61 38 34.0	Roma..... Garcona.....	3.857244 4.001295	7,198.5 10,029.9	23,617 32,906
Roma, Church of the Covenant, cupola, 1917.	26 24 23.118 99 01 02.053	171 23 38.2 241 53 28.9	351 23 21.0 61 55 50.9	Roma..... Garcona.....	3.854194 4.000919	7,148.2 10,021.2	23,452 32,878
Oil derrick no. 1, 1917 ¹	26 36 08.73 99 00 19.57	321 01 25 324 55 11	141 02 58 144 56 49	Banchez..... Chinges.....	3.963525 4.024342	9,194.4 10,576.5	30,165 34,700
Oil derrick no. 2, 1917 ¹	26 35 16.93 98 58 46.16	330 04 21 333 41 08	150 05 13 153 42 05	Banchez..... Chinges.....	3.806792 3.896434	6,409.0 7,878.3	21,027 25,847
Windmill A, 1917 ¹	26 37 17.48 99 04 12.65	199 22 01 248 07 46	19 22 13 68 08 19	Flores..... Burros.....	3.341769 3.332331	2,196.7 2,149.5	7,207 7,052
Zapata post office, flagpole, 1917.....	26 52 31.118 99 18 46.191	163 17 18.7 250 22 24.3	343 16 37.2 70 22 50.3	Urebeno..... Zapata.....	3.944729 3.225829	8,805.0 1,682.0	28,888 5,518
Zapata, church steeple, 1917.....	26 52 15.606 99 18 45.757	164 03 59.7 236 27 26.3	344 03 17.9 56 27 52.0	Urebeno..... Zapata.....	3.966917 3.275649	9,266.5 1,886.5	30,402 6,189
Urebeno, green roof, north gable, 1917.....	26 55 40.501 99 20 19.521	180 56 02.9 321 40 29.9	0 56 03.6 141 41 38.1	Urebeno..... Zapata.....	3.415737 3.826643	2,604.6 6,708.8	8,545 22,010
San Ygnacio, white church spire, 1917 ¹	27 02 38.30 99 26 27.02	254 45 11 312 40 45	74 46 45 132 43 00	Ygnacio..... Feora.....	3.771956 4.049386	5,915.0 11,204.3	19,406 36,759
Windmill west of station George, 1917.....	27 20 18.017 99 24 29.085	262 20 36.4 332 02 49.3	82 23 20.1 152 05 20.9	George..... Dan.....	3.994818 4.288743	9,881.4 19,442.1	32,419 63,786
Windmill northwest of station Dolores, 1917.....	27 20 27.714 99 28 35.054	176 31 12.2 205 47 50.1	356 30 53.0 25 49 24.2	Laredo..... Fort.....	4.273913 4.110906	18,789.4 12,909.4	61,645 42,354
Windmill south of station Fort, 1917.....	27 25 54.456 99 25 05.517	214 21 18.4 227 02 24.3	34 23 02.9 47 04 52.8	Taylor..... Casbeer.....	4.042137 4.081990	11,018.9 12,077.9	36,151 39,626
House north of station Taylor, south gable, 1917. ¹	27 34 00.59 99 21 30.32	336 28 18 356 57 23	156 29 07 176 57 29	Casbeer..... Taylor.....	3.869030 3.769094	7,345.6 5,876.2	24,100 19,279
Laredo, electric light and power plant, standpipe, 1917.	27 30 03.817 99 29 03.764	155 57 37.9 185 21 23.7	335 56 15.2 5 21 47.5	Knob..... Orvil.....	4.080288 4.178895	12,030.6 15,097.1	39,470 49,531
Laredo, electric light and power plant, brick stack, 1917.	27 30 03.683 99 29 04.967	156 06 43.2 185 28 46.4	336 05 21.1 5 29 10.8	Knob..... Orvil.....	4.079939 4.179102	12,021.0 15,104.3	39,439 49,555
Laredo Catholic Church, steeple, 1917.....	27 30 07.688 99 30 18.291	165 16 11.9 204 56 38.3	345 15 23.7 85 00 47.4	Knob..... Taylor.....	4.050637 4.172020	11,236.7 14,860.0	36,866 48,753
Laredo, north wireless mast, 1917.....	27 30 25.278 99 31 06.018	198 19 42.8 304 43 31.8	18 21 03.2 124 46 15.9	Orvil..... Fort.....	4.180114 4.074802	15,139.6 11,879.6	49,671 38,975

¹ No check on this position.² Checked by vertical angles only.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Laredo, south wireless mast, 1917.....	27 30 20.143 99 31 04.381	197 58 56.5 304 13 02.5	18 00 16.1 124 15 45.8	Orvil..... Fort.....	4.184003 4.070153	15,275.8 11,753.1	50,117 38,560
Laredo latitude station, 1895 ¹	27 30 27.31 99 31 07.65						
Laredo longitude station, 1895 ¹	27 30 27.31 99 31 07.59						
Nuevo Laredo Presbyterian Church (Mexico), 1917.....	27 30 30.008 99 30 08.908	192 39 33.5 310 09 07.8	12 40 27.5 130 11 25.5	Orvil..... Fort.....	4.163754 4.030286	14,579.9 10,722.3	47,834 35,178
Nuevo Laredo, standpipe (Mexico), 1917.....	27 29 13.001 99 31 02.656	228 22 00.9 295 09 32.6	48 22 49.9 115 12 15.1	Laredo..... Fort.....	3.590412 4.028778	3,894.1 10,685.1	12,776 35,056
Nuevo Laredo, church (Mexico), 1917.....	27 29 34.097 99 30 29.747	226 00 46.1 300 38 08.7	46 01 19.9 120 40 36.0	Laredo..... Fort.....	3.445594 4.008173	2,789.9 10,190.0	9,153 33,432
Central Laredo waterworks, standpipe, 1917.....	27 30 04.793 99 30 29.035	166 50 11.8 264 42 19.2	346 49 28.6 84 46 33.3	Knob..... Taylor.....	4.051232 4.180750	11,252.1 15,161.8	36,916 49,743
Central Laredo waterworks, brick stack, 1917.....	27 30 03.334 99 30 28.851	166 51 48.5 264 32 04.7	346 51 05.2 84 36 18.7	Knob..... Taylor.....	4.052961 4.180727	11,296.9 15,161.0	37,063 49,741
White house (Mexico) 1917 ¹	27 34 40.31 99 31 49.94	172 05 31 222 26 41	352 05 25 42 28 21	Knob..... Orvil.....	3.397848 3.946374	2,499.5 8,838.4	8,200 28,997
White windmill southwest of station Orvil, 1917.....	27 36 49.742 99 28 29.054	75 33 45.7 128 22 20.1	255 32 06.8 308 19 34.5	Knob..... Fieldings.....	3.781295 4.040235	6,043.6 10,970.7	19,828 35,993
Pumping station, southernmost of two stacks, 1917. ¹	27 34 52.86 99 31 45.55	167 28 35 223 36 26	347 28 27 43 38 05	Knob..... Orvil.....	3.330510 3.928090	2,140.5 8,474.0	7,023 27,802
Windmill east of station Orvil, 1917.....	27 33 49.272 99 27 27.914	106 57 06.8 163 58 36.7	286 54 12.7 343 57 31.2	Fieldings..... Davis.....	4.031138 4.145903	10,743.3 13,992.7	35,247 45,908
Windmill near Maverick, 1937.....	27 37 42.697 99 30 23.934	40 44 06.4 133 31 20.9	220 43 20.7 313 29 48.5	Knob..... Fieldings.....	3.617116 3.876212	4,141.1 7,519.9	13,586 24,672
Windmill northeast of station Knob, 1917.....	27 40 01.680 99 31 36.224	301 05 16.3 5 32 40.1	121 06 50.9 185 32 27.9	Orvil..... Knob.....	3.814666 3.872212	6,526.3 7,451.0	21,412 24,445
Windmill northeast of station Orvil, 1917.....	27 41 45.240 99 27 18.519	77 46 04.0 152 50 57.1	257 43 05.4 332 49 47.1	Fieldings..... Davis.....	4.032566 3.955572	10,778.7 9,027.6	35,363 29,618
Small house, mine, 1917.....	27 41 36.244 99 43 14.536	277 16 49.2 299 13 47.6	97 21 14.8 119 18 59.5	Fieldings..... Knob.....	4.198456 4.324681	15,792.7 21,119.4	51,813 69,289
Matthews' ranch, windmill, 1917.....	27 41 28.471 99 35 21.724	116 10 54.9 127 16 07.5	296 08 49.1 307 13 24.0	Tordillo..... Coleman.....	3.917080 4.082906	8,261.9 12,103.4	27,106 39,709
Isabel, 1917.....	27 39 52.574 99 38 45.278	164 25 27.2 261 52 44.5	344 24 56.0 81 55 04.9	Tordillo..... Fieldings.....	3.835464 3.922748	6,846.4 8,370.4	22,462 27,462
Windmill northeast of station Fieldings, 1917. ¹	27 41 39.37 99 33 40.85	1 31 59 108 01 30	181 31 58 287 58 37	Fieldings..... Tordillo.....	3.323972 4.029497	2,108.5 10,702.8	6,918 35,114
Windmill east of north of station Fieldings, 1917. ¹	27 43 22.65 99 34 48.88	341 07 10 90 54 17	161 07 41 270 51 56	Fieldings..... Tordillo.....	3.747201 3.919861	5,587.3 8,315.0	18,331 27,280
Arsia ranch, windmill, 1917.....	27 44 39.668 99 30 58.657	81 18 54.2 94 55 44.5	261 14 45.8 274 50 58.2	Tordillo..... Coleman.....	4.169965 4.227843	14,789.9 16,898.3	48,523 55,441
Tordillo, white house, west gable, 1917 ¹	27 43 51.33 99 36 58.97	80 59 18 112 48 15	260 57 57 292 46 17	Tordillo..... Coleman.....	3.682118 3.878507	4,809.7 7,559.7	15,780 24,802
Windmill northeast of Margarita ranch, 1917. ¹	27 47 54.87 99 31 07.58	327 14 27 60 10 26	147 15 03 240 06 21	Davis..... Tordillo.....	3.599631 4.219348	3,977.7 16,571.0	13,050 54,367
Windmill, no wheel, 1917 ¹	27 47 52.04 99 28 16.29	37 54 56 140 11 27	217 54 13 320 10 50	Davis..... Tajone.....	3.615934 3.539530	4,129.8 3,463.6	13,549 11,363
Windmill south of station Tajone, 1917 ¹	27 48 59.23 99 29 01.31	13 46 04 121 00 38	193 45 41 301 00 22	Davis..... Tajone.....	3.739100 3.060615	5,484.0 1,149.8	17,992 3,772
Windmill northeast of station Cup, 1917.....	28 04 33.199 99 44 06.185	102 18 48.2 162 44 34.8	282 16 16.8 342 42 25.8	Twin..... Cat.....	3.953437 4.399349	8,983.3 25,081.2	29,473 82,287
Espey's ranch, windmill, 1917 ¹	28 08 38.01 99 49 33.42	358 24 09 130 07 40	178 24 12 310 04 56	Twin..... Tom.....	3.750153 4.091890	5,625.4 12,356.3	18,456 40,539
House northwest of station Twin, south gable, 1917.....	28 09 20.790 99 52 15.000	130 15 26.0 142 48 23.7	310 13 53.0 322 46 56.4	Big..... Tom.....	3.847534 3.921182	7,039.4 8,340.3	23,095 27,363
Windmill near station Big, 1917.....	28 11 54.988 99 54 39.124	82 08 52.4 149 37 03.3	262 08 27.4 329 36 44.0	Big..... Tom.....	3.162865 3.342047	1,455.0 2,198.1	4,774 7,212
Dentonio hotel, south gable, 1918.....	28 19 17.943 99 57 17.775	190 21 38.4 307 53 49.3	10 21 58.8 127 54 20.6	Carlow..... Dentonio.....	3.815258 3.358192	6,535.2 2,281.4	21,441 7,485

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Dentonio windmill, 1918.....	28 19 31.749 99 57 14.682	284 45 54.1 345 34 08.6	104 49 58.6 165 35 03.0	Cat..... Tom.....	4.162117 4.098997	14,525.0 12,560.2	47,654 41,208
Windmill near clump of trees, 1918.....	28 19 55.558 99 57 35.480	197 27 18.8 318 16 06.9	17 27 47.6 138 16 46.6	Carlow..... Dentonio.....	3.742351 3.535192	5,525.2 3,429.2	18,127 11,251
Windmill, 1918.....	28 21 28.136 99 58 53.505	237 22 08.4 320 48 58.2	57 23 14.4 140 50 15.0	Carlow..... Dentonio.....	3.652297 3.843696	4,490.5 6,977.4	14,733 22,892
Windmill near station Barr, 1918.....	28 18 05.322 100 02 01.280	225 44 23.4 310 57 10.3	45 46 58.5 131 00 20.3	Carlow..... Tom.....	4.094089 4.161137	12,419.1 14,492.3	40,745 47,547
Red, 1918.....	28 20 28.381 100 02 18.667	245 31 32.6 320 36 00.1	65 34 16.0 140 39 18.5	Carlow..... Tom.....	4.012518 4.255053	10,292.4 17,990.9	33,768 59,025
Windmill near station Red, 1918.....	28 19 42.175 100 01 35.426	283 39 46.9 320 37 54.6	103 42 20.4 140 40 52.4	Dentonio..... Tom.....	3.957932 4.208017	9,076.8 16,144.2	29,779 52,966
Windmill near station Red (no wheel), 1918.....	28 20 03.689 100 01 58.300	286 32 54.3 320 25 19.1	106 35 38.7 140 28 27.8	Dentonio..... Tom.....	3.993488 4.231764	9,851.2 17,051.6	32,320 55,943
Windmill, 1918.....	28 23 26.585 100 08 54.372	61 43 00.1 108 46 21.0	241 40 57.5 288 43 15.4	Indio..... Farland.....	3.901943 4.049828	7,978.9 11,215.7	26,177 36,797
Silo, single gray, 1918 ¹	28 31 57.96 100 21 24.02	212 51 43 261 13 09	32 53 53 81 16 54	Davidson..... Kennedy.....	4.136041 4.112245	13,678.6 12,949.3	44,877 42,484
Spire, mine (Mexico), 1918.....	28 37 23.929 100 37 23.346	232 07 29.9 238 11 29.0	52 11 15.5 58 16 16.1	Laplace..... Pass.....	4.208910 4.281271	16,177.4 19,110.5	53,075 62,698
Stack, mine (Mexico), 1918.....	28 34 39.188 100 40 38.507	230 16 44.2 234 52 16.2	50 22 03.3 54 58 36.7	Laplace..... Pass.....	4.370857 4.420509	23,488.6 26,333.5	77,062 86,396
Stack, mine (Mexico), 1918.....	28 36 48.651 100 38 05.688	231 37 55.2 237 18 28.5	51 42 01.2 57 23 35.9	Laplace..... Pass.....	4.219266 4.315189	17,752.8 20,662.8	58,244 67,791
Flat-roofed building, chimney (Mexico), 1918.....	28 37 26.868 100 37 26.964	232 35 25.9 238 34 33.8	52 39 13.3 58 39 22.6	Laplace..... Pass.....	4.209515 4.282094	16,200.0 19,146.7	53,149 62,817
Tallest of 3 stacks, mine (Mexico), 1918.....	28 38 11.901 100 36 34.519	233 32 49.6 240 02 56.6	53 36 12.0 60 07 20.2	Laplace..... Pass.....	4.153151 4.235881	14,228.2 17,214.0	46,680 56,476
Tank near station Laplace, 1918.....	28 42 43.791 100 29 29.607	246 53 33.0 266 21 46.5	66 54 41.5 86 22 46.4	Eagle..... Pass.....	3.623807 3.530122	4,205.4 3,389.4	13,797 11,120
Laplace latitude and longitude station, 1919 ¹	28 42 46.44 100 29 32.86						
Eagle Pass, Water & Power Co., tall stack, 1918.....	28 42 38.996 100 30 23.788	251 22 46.3 265 43 12.6	71 24 20.8 85 44 38.5	Eagle..... Pass.....	3.750757 3.687231	5,633.2 4,866.1	18,482 15,967
Eagle Pass Catholic Church, cross, 1918.....	28 42 37.229 100 30 22.708	250 45 32.6 265 03 09.1	70 47 06.6 85 04 34.5	Eagle..... Pass.....	3.749979 3.685009	5,623.1 4,841.8	18,448 15,885
Eagle Pass convent, cupola, 1918.....	28 42 57.115 100 30 01.838	255 20 27.0 272 37 14.3	75 21 51.0 92 38 29.7	Eagle..... Pass.....	3.690395 3.629593	4,902.2 4,261.8	16,083 13,982
North Eagle Pass, prominent building, lattice-work on roof, 1918.....	28 43 11.192 100 29 59.977	260 14 20.3 278 29 38.5	80 15 43.4 98 30 53.0	Eagle..... Pass.....	3.677707 3.628746	4,761.1 4,253.5	15,620 13,955
International Coal Mine, tank, 1918.....	28 45 27.471 100 31 10.869	297 06 41.1 331 47 49.7	117 08 38.3 151 48 36.8	Eagle..... Laplace.....	3.871146 3.750419	7,432.7 5,628.8	24,385 18,467
Lone tree, 1918.....	28 45 56.501 100 23 19.326	49 23 29.0 55 17 23.6	229 21 30.9 235 15 34.1	Pass..... Eagle.....	3.943603 3.876131	8,782.2 7,518.5	28,813 24,667
Lamar mine, tank, 1918 ¹	28 48 02.69 100 28 29.24	349 42 18 119 15 26	169 42 49 299 14 08	Pass..... Nine.....	3.989454 3.699972	9,760.1 5,011.5	32,021 16,442
Windmill south of station Nine, 1918 ¹	28 48 12.76 100 31 17.47	185 02 50 199 37 08	5 02 53 19 37 59	Nine..... Burr.....	3.331769 3.933450	2,146.7 8,579.3	7,043 28,147
Windmill northeast of station Nine, 1918 ¹	28 50 46.70 100 30 50.86	212 52 04 11 34 35	32 52 42 191 34 26	Burr..... Nine.....	3.599767 3.424007	3,978.9 2,654.6	13,054 8,709
House 12 miles northwest of Eagle Pass, cupola, 1918. ¹	28 51 55.38 100 37 19.63	312 39 43 316 04 20	132 44 38 136 09 06	Eagle..... Pass.....	4.354215 4.366885	22,605.5 23,264.0	74,165 76,325
Paloma ranch, windmill, 1918 ¹	28 52 46.23 100 24 34.45	87 36 49 133 00 17	267 34 25 312 58 07	Burr..... Pen.....	3.905703 4.000051	8,048.3 10,001.2	26,405 32,812
House 3 miles northwest of Paloma, north gable, 1918. ¹	28 54 26.48 100 27 02.10	138 23 53 289 34 09	318 22 54 109 35 38	Pen..... Paloma.....	3.698311 3.724875	4,992.4 5,307.3	16,379 17,412
Windmill near station Lake, 1918.....	28 59 53.432 100 31 36.971	326 53 25.2 34 18 18.3	146 54 39.0 214 17 08.7	Pen..... Wifp.....	3.878505 3.838990	7,559.7 6,902.2	24,802 22,645
Windmill near station White, 1918.....	29 00 09.909 100 31 01.831	335 04 48.9 37 56 56.0	155 05 45.7 217 55 29.4	Pen..... Wifp.....	3.877484 3.896150	7,542.0 7,873.2	24,744 25,831

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Tank near red-roofed building, 1918.....	28 59 39.111 100 24 29.017	355 43 19.5 51 42 39.6	175 43 34.7 231 40 26.2	Paloma..... Pen.....	4.058249 3.977956	11,435.3 9,505.1	37,517 31,185
Jamerson ranch, windmill, 1918.....	29 06 36.545 100 33 32.900	36 47 10.5 150 58 51.7	216 45 37.1 330 57 39.0	Towne..... Peters.....	3.938562 3.920040	8,680.8 8,318.4	28,480 27,291
Neely's ranch, windmill, 1918.....	29 07 21.464 100 33 21.422	33 27 44.4 143 35 13.2	213 16 05.4 323 33 54.9	Towne..... Peters.....	3.999613 3.864544	9,991.1 7,320.6	32,779 24,018
Windmill, 1918.....	29 06 51.013 100 37 12.038	195 26 28.4 275 52 34.0	15 27 02.4 95 54 19.3	Peters..... Jamerson.....	3.850267 3.769543	7,083.8 5,882.2	23,241 19,299
Spofford, church steeple, 1918 ¹	29 10 18.24 100 24 31.27	91 25 18 185 34 57	271 19 41 5 35 33	Peters..... Brackett.....	4.271290 4.313225	18,676.3 20,569.6	61,274 67,485
Anacacho Mountains, highest peak, 1918 ¹	29 11 03.79 100 17 14.28	18 35 40 35 30 37	198 32 24 215 24 52	Paloma..... Pen.....	4.534868 4.520013	34,266.4 33,114.1	112,422 108,642
Brackettville, church, 1918 ¹	29 18 22.25 100 25 17.49	87 20 55 210 14 30	267 13 23 30 15 29	Ross..... Brackett.....	4.397145 3.809438	24,954.3 6,448.2	81,871 21,155
Brackettville, Army post flagpole, 1918 ¹	29 18 19.40 100 25 15.57	87 33 17 209 27 27	267 25 44 29 28 25	Ross..... Brackett.....	4.397979 3.812800	25,002.2 6,498.3	82,028 21,320
Brackettville, house, cupola, 1918 ¹	29 18 10.05 100 25 20.39	88 12 17 209 13 07	268 04 46 29 14 07	Ross..... Brackett.....	4.395528 3.833353	24,861.5 6,813.2	81,566 22,353
Brackettville standpipe, 1918.....	29 18 20.748 100 25 22.276	50 13 33.6 87 26 26.7	230 08 21.3 267 18 57.0	Peters..... Ross.....	4.352169 4.394859	22,499.3 24,823.3	73,816 81,441
Windmill northeast of station Johnstone, 1918. ¹	29 23 01.33 100 45 53.52	33 21 52 46 40 32	213 21 43 226 39 19	Johnstone..... Dobkins.....	2.927053 3.738892	845.4 5,481.4	2,774 17,984
Johnstone latitude and longitude station, 1919 ¹	29 22 38.31 100 46 11.00						
Precise level B.M. E 31, 1918 ¹	29 22 41.06 100 46 03.17	68 08 10	243 08 06	Johnstone.....	2.343113	220.35	722.9
Windmill south of station Johnstone, 1918 ¹	29 22 19.80 100 46 05.05	55 58 23 164 57 16	235 57 16 344 57 13	Dobkins..... Johnstone.....	3.647001 2.773028	4,436.1 593.0	14,554 1,946
Del Rio standpipe, finial, 1918 ¹	29 22 06.41 100 54 11.21	176 16 45 282 21 09	356 16 34 102 24 01	Kelly..... Dobkins.....	3.976479 3.985047	9,472.8 9,661.6	31,079 31,698
Windmill near station Moore, 1918.....	29 29 10.117 100 48 27.184	70 03 03.0 238 29 17.3	250 00 02.5 58 32 55.6	Kelly..... Hamilton.....	4.021874 4.145781	10,516.6 13,988.8	34,503 45,895
Windmill north of station Moore, 1918.....	29 31 11.233 100 48 40.675	2 39 05.5 52 27 31.2	182 39 02.6 232 24 37.3	Moore..... Kelly.....	3.537415 4.079502	3,446.8 12,008.9	11,308 39,396
Jim, cairn, 1918 ¹	29 46 14.21 101 09 30.97	43 50 22 191 23 14	223 50 06 11 23 14	McNutt..... Jim.....	3.095899 0.698392	1,247.1 5.0	4,092 16
Word, 1918.....	30 02 54.783 101 01 27.246	23 36 55.9 91 35 48.6	203 32 38.7 271 26 26.0	McNutt..... Blue.....	4.539036 4.478670	34,596.8 30,107.2	113,506 98,777
Dryden east base latitude and longitude station, 1919. ¹	30 02 40.08 102 05 54.46						
Dryden water tank, 1918.....	30 02 47.548 102 06 53.268	48 58 55.1 178 34 01.5	228 57 22.7 358 33 57.8	Eldridge..... Hen.....	3.817086 3.901243	6,562.8 7,966.0	21,531 26,135
Twin Buttes (U.S.G.S. signal), 1918 ¹	29 57 27.14 102 15 25.82	134 00 07 237 39 55	313 58 49 57 42 39	Road..... Eldridge.....	3.765663 4.016911	5,829.9 10,397.1	19,127 34,111
Mofeta, section house, south gable, 1918 ¹	30 03 15.84 102 13 33.54	311 52 34 47 08 04	131 54 22 227 05 50	Eldridge..... Road.....	3.889690 3.992444	7,756.9 9,827.5	25,449 32,242
Santa Rosa Mountain (Mexico), 1918.....	29 05 27.978 102 37 13.729	203 19 20.9 211 14 12.3	23 32 47.6 31 31 39.5	Eldridge..... Peggy.....	5.044250 5.041139	110,726.1 109,935.8	363,274 360,681
Round Mountain (Mexico), 1918.....	29 11 36.341 101 47 43.766	191 44 46.6 204 50 15.3	11 50 40.3 25 03 52.4	Babb..... Blue.....	4.974142 5.022923	94,219.8 105,420.0	309,119 345,865
Sharp tip (Mexico), 1918.....	29 21 27.889 102 36 37.412	183 48 51.2 202 57 18.2	3 50 28.1 23 06 30.4	New..... Road.....	4.895988 4.884459	78,702.4 76,640.6	258,209 251,445
Tres Hermanos, 1918 ¹	30 00 44.80 102 56 29.70	176 14 13 260 47 57	356 13 53 80 59 32	Brown..... New.....	4.198443 4.575816	15,792.2 37,654.4	51,812 123,538
Tres Hermanos (cairn), 1918.....	30 00 45.436 102 56 29.789	224 52 14.4 260 49 45.0	44 57 23.8 81 01 19.7	Dry..... New.....	4.369467 4.575809	23,413.5 37,653.8	76,816 123,535
White tip, 1918.....	30 12 20.358 102 45 51.917	6 30 54.5 72 41 02.2	166 30 44.1 252 35 22.1	Dry..... Brown.....	3.685593 4.277913	4,848.3 18,963.3	15,906 62,215
Marathon, 1917 ¹	30 12 31.64 108 16 10.73	281 02 24 98 29 43	101 11 58 278 22 18	Brown..... Ord (U.S.G.S.).....	4.493389 4.377865	31,145.0 23,870.7	102,182 78,316

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Ord (U.S.G.S.), cairn, 1917 ¹ -----	° ' "	° ' "	° ' "	Ord (U.S.G.S.)----- Brown-----	1. 220754	16. 6	54
	103 30 53.47	157 07 24 279 47 52	337 07 24 100 04 51		4. 740311	54, 993. 5	180, 425
Star (U.S.G.S.), 1917 ¹ -----	30 46 38.13 103 47 37.39	115 50	295 50	Star-----	1. 452093	28. 32	92. 9
Tree (U.S.G.S.) signal, 1917 ¹ -----	30 46 38.21 103 47 37.62	117 02	297 02	Star-----	1. 336460	21. 7	71
Baldy (U.S.G.S.), 1917 ¹ -----	30 38 07.63 104 10 23.40	87 44 15	267 44 15	Baldy-----	0. 748188	5. 60	18. 4
Black Mountain, 1917-----	30 43 20.790 103 58 52.674	163 49 18.0 251 11 56.9	343 46 24.2 71 17 41.8	Newman----- Star-----	4. 508702 4. 277418	32, 262. 8 18, 941. 7	105, 849 62, 145
Flat cone, southeast Boracho, 1917 ¹ -----	30 56 29.26 104 23 23.42	172 54 07 257 20 41	352 52 57 77 30 24	Krouse----- Newman-----	4. 463114 4. 488210	29, 047. 9 30, 775. 8	95, 301 100, 970
Goat Mountain, northwest end, 1917 ¹ -----	29 45 14.45 103 57 16.62	167 53 46 218 05 31	347 47 10 38 18 42	Baldy----- Ord (U.S.G.S.)-----	4. 999786 4. 836348	99, 950. 7 68, 603. 8	327, 922 225, 078

San Antonio-Del Rio arc

<i>Principal points</i>							
Miller, 1924	29 32 52.832 98 21 17.890	224 54 45.48 270 47 11.62	45 00 24.54 90 54 20.22	Mission Herndon	4. 4167710 4. 3692719	26, 107. 84 23, 403. 02	85, 655. 5 76, 781. 4
Bulverde, 1924	29 42 45.080 98 25 21.282	269 23 15.75 301 45 22.93 340 13 55.14	89 30 56.30 121 54 32.94 160 15 55.47	Mission Herndon Miller	4. 3975278 4. 5468837 4. 2872384	24, 976. 28 35, 227. 65 19, 374. 85	81, 943. 0 115, 576. 0 63, 565. 7
Mission eccentric, 1924	29 42 52.638 98 09 52.172	195 02 51.8 45 00 50.30 89 31 48.28 345 17 24.39	15 02 51.8 224 55 11.27 269 24 07.76 165 18 55.08	Mission Miller Bulverde Herndon	0. 815312 4. 4166768 4. 3974974 4. 2889127	6. 536 26, 102. 18 24, 974. 53 19, 449. 69	21. 44 85, 636. 9 81, 937. 3 63, 811. 2

Hillcrest, 1924	29 28 53.271 98 34 00.596	208 35 01.51 250 11 44.51	28 39 18.00 70 18 00.26	Bulverde Miller	4. 4650174 4. 3389560	29, 175. 44 21, 825. 09	95, 719. 8 71, 604. 5
Smith, 1924	29 41 15.368 98 45 46.124	265 07 13.76 291 17 21.45 320 13 25.69	85 17 20.62 111 29 27.07 140 19 14.01	Bulverde Miller Hillcrest	4. 5190726 4. 6276130 4. 4728831	33, 042. 48 42, 424. 14 29, 706. 66	108, 406. 9 139, 186. 5 97, 469. 2
Gallagher (U.S.G.S.), 1924	29 36 24.185 98 50 53.584	222 40 01.77 296 54 29.81	42 42 33.86 117 02 49.31	Smith Hillcrest	4. 0862505 4. 4857758	12, 196. 93 30, 603. 83	40, 016. 1 100, 406. 1
Medina, 1924	29 26 07.564 98 50 31.045	178 10 13.29 195 19 30.98 259 06 37.12	358 10 02.19 15 21 51.56 79 14 44.22	Gallagher (U.S.G.S.) Smith Hillcrest	4. 2786356 4. 4621550 4. 4341295	18, 994. 84 28, 983. 78 27, 172. 49	62, 318. 9 95, 091. 0 89, 148. 4
Peachtree, 1924	29 34 28.489 99 07 21.353	262 17 59.11 299 28 26.93	82 26 06.88 119 36 44.51	Gallagher (U.S.G.S.) Medina	4. 4284594 4. 4952481	26, 820. 04 31, 278. 65	87, 992. 1 102, 620. 0
Schmidt, 1924	29 22 13.397 99 00 13.434	153 02 03.24 209 53 34.36 245 17 52.23	332 58 32.70 29 58 09.95 65 22 38.15	Peachtree Gallagher (U.S.G.S.) Medina	4. 4048333 4. 4803827 4. 2374937	25, 399. 98 30, 226. 14 17, 278. 01	83, 333. 1 99, 166. 9 56, 686. 3
Fohn (U.S.G.S.), 1924	29 16 01.429 99 13 40.495	196 39 56.12 242 12 22.71	16 43 02.36 62 18 57.90	Peachtree Schmidt	4. 5512552 4. 3910217	35, 584. 03 24, 604. 90	116, 745. 3 80, 724. 6
Hackberry, 1924	29 34 23.477 99 18 53.191	269 28 40.04 306 36 42.24 346 01 37.89	89 34 21.49 126 45 53.15 166 04 11.49	Peachtree Schmidt Fohn (U.S.G.S.)	4. 2700306 4. 5754519 4. 5435933	18, 622. 18 37, 622. 87 34, 961. 76	61, 096. 3 123, 434. 4 114, 703. 7
Crane, 1924	29 32 29.773 99 28 17.595	256 59 10.42 322 05 19.24	77 03 48.84 142 12 29.87	Hackberry Fohn (U.S.G.S.)	4. 1929033 4. 5858858	15, 592. 05 38, 537. 70	51, 154. 9 126, 435. 8
Kennedy, 1924	29 10 29.289 99 24 53.391	172 17 54.30 192 22 57.55 240 35 24.32	352 16 14.18 12 25 54.23 60 40 52.81	Crane Hackberry Fohn (U.S.G.S.)	4. 6130673 4. 6552547 4. 3191810	41, 026. 76 45, 212. 10 20, 853. 60	134, 602. 0 148, 333. 4 68, 417. 2
Bald, 1924	29 30 47.296 99 35 19.830	254 27 42.95 335 41 55.64	74 31 11.04 155 47 02.63	Crane Kennedy	4. 0718729 4. 6141808	11, 799. 75 41, 132. 09	38, 713. 0 134, 947. 5
Blue, 1924	29 18 12.471 99 40 02.490	198 08 06.99 215 42 04.31 300 05 22.37	18 10 25.79 35 47 50.59 120 12 46.43	Bald Crane Kennedy	4. 3884102 4. 5121903 4. 4531781	24, 457. 40 32, 522. 98 28, 390. 83	80, 240. 7 106, 702. 5 93, 145. 6
Cycamore, 1924	29 28 10.077 99 56 28.811	261 51 12.40 304 36 27.85	82 01 37.11 124 44 31.83	Bald Blue	4. 5381299 4. 5097490	34, 524. 70 32, 340. 67	113, 269. 8 106, 104. 3
Allen, 1924	29 12 04.559 99 58 34.041	186 28 32.38 227 18 59.94 249 14 51.22	6 29 33.73 47 30 23.46 69 23 54.38	Cycamore Bald Blue	4. 4759304 4. 7082472 4. 5062236	29, 917. 85 51, 079. 56 32, 079. 21	98, 155. 5 167, 583. 5 105, 246. 5
Cline, 1924	29 12 01.979 100 08 30.246	213 05 46.96 269 40 37.25	33 11 39.40 89 45 28.12	Cycamore Allen	4. 5514271 4. 2069959	35, 598. 12 16, 106. 30	116, 791. 5 52, 942. 1

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Principal points—Continued								
Moras, 1924.....	29 21 23.176	253 46 26.07	73 59 35.90	Cycamore.....	4.6544718	45,130.67	148,066.2	
	100 23 17.092	293 08 52.19	113 20 57.50	Allen.....	4.6392008	43,571.33	142,950.3	
		305 45 32.53	125 52 46.25	Cline.....	4.4701666	29,523.41	96,861.4	
		45 56 36.34	225 50 22.29	Peters.....	4.4589262	28,769.09	94,386.6	
		76 35 29.55	256 26 58.22	Ross.....	4.4618995	28,966.73	95,035.0	
		89 03 29.15	268 51 11.78	Dobkins.....	4.6083431	40,582.91	133,145.8	
		127 05 18.98	306 56 34.25	Hamilton.....	4.5564717	36,014.02	118,156.0	
Anacacho, 1924.....	29 11 04.083	152 49 50.51	332 46 53.14	Moras.....	4.3310090	21,429.20	70,305.6	
	100 17 14.328	226 41 15.67	46 51 25.72	Cycamore.....	4.6639002	46,121.16	151,315.8	
		262 47 21.07	82 51 36.69	Cline.....	4.1544449	14,270.69	46,819.8	
		88 15 57.04	268 06 47.12	Peters.....	4.4841738	30,491.15	100,036.4	
		108 02 52.54	287 51 25.37	Ross.....	4.6013291	39,932.74	131,012.7	
Supplementary points								
Miller (U.S.G.S.), 1924.....	29 32 52.869 98 21 17.784	68 31	248 31	Miller.....	0.487280	3.071	10.08	
Bulverde (U.S.E.), 1924.....	29 42 45.079 98 25 21.287	250 17	70 17	Bulverde.....	9.113943	0.130	0.43	
Smith (U.S.G.S.), 1924.....	29 41 15.363 98 45 46.125	185 13	5 13	Smith.....	9.190332	0.155	0.51	
Wurzbach (U.S.G.S.), 1924.....	29 26 07.770 98 50 31.029	3 48 02	183 48 02	Medina.....	0.803867	6.366	20.89	
Schmidt (U.S.G.S.), 1924.....	29 22 13.601 99 00 13.442	357 57 58	177 57 58	Schmidt.....	0.798651	6.290	20.64	
Schmidt astronomical station, 1924.....	29 22 13.403 99 00 13.094	88 51 58	268 51 58	Schmidt.....	0.962843	9.18	30.1	
Hondo, 1924.....	29 20 56.006 99 06 57.989	50 10 00.8 142 15 59.8 178 33 35.8	230 06 43.8 322 10 08.1 358 33 24.3	Fohn (U.S.G.S.)..... Hackberry..... Peachtree.....	4.150776 4.497701 4.398343	14,150.6 31,455.8 25,023.2	46,426 103,201 82,097	
B.M.C 35, 1924.....	29 20 56.006 99 06 57.622	90 04	270 04	Hondo.....	0.995416	9.895	32.46	
Hondo water tank, 1924 ¹	29 20 46.56 99 08 19.62	262 28 29 44 37 46	82 29 09 224 35 08	Hondo..... Fohn (U.S.G.S.).....	3.346591 4.090993	2,221.2 12,330.8	7,287 40,455	
Hondo courthouse, tower, 1924 ¹	29 21 01.90 99 08 27.69	274 17 04 42 24 03	94 17 48 222 21 30	Hondo..... Fohn (U.S.G.S.).....	3.385001 4.097723	2,426.6 12,523.4	7,961 41,087	
Hackberry (U.S.G.S.), 1924.....	29 34 23.464 99 18 53.160	116 04	296 04	Hackberry.....	9.966611	0.926	3.04	
Crane (U.S.G.S.), 1924.....	29 32 29.758 99 28 17.752	263 34	83 34	Crane.....	0.628082	4.247	13.93	
Irishman (U.S.G.S.), 1924.....	29 10 29.319 99 24 50.699	89 15 40	269 15 38	Kennedy.....	1.861809	72.746	238.67	
Sabinal, new water tank, 1924.....	29 19 08.982 99 28 08.528	84 53 18.5 179 25 57.6 341 45 32.6	264 47 29.0 359 25 53.2 161 47 08.0	Blue..... Crane..... Kennedy.....	4.286567 4.391930 4.226482	19,344.9 24,656.4 16,845.4	63,467 80,894 55,267	
Peters (U.S.G.S.), 1924.....	29 30 47.233 99 35 19.848	193 54	13 54	Bald.....	0.301030	2.00	6.6	
Blue Mountain (U.S.G.S.), 1924.....	29 18 12.447 99 40 01.738	92 04 44	272 04 44	Blue.....	1.307410	20.296	66.59	
Sycamore (U.S.G.S.), 1924.....	29 28 10.122 99 56 28.797	15 09	195 09	Cycamore.....	0.156246	1.433	4.70	
Allen (U.S.G.S.), 1924.....	29 12 04.485 99 58 33.990	148 30 55	328 30 55	Allen.....	0.424064	2.655	8.71	
B.M. I 32, 1924.....	29 08 16.894 100 23 58.043	182 36 45.4 244 42 56.3	2 37 05.4 64 46 13.0	Moras..... Anacacho.....	4.384408 4.081476	24,233.0 12,063.6	79,504 39,579	
Las Moras (U.S.G.S.), 1924.....	29 21 22.674 100 23 17.183	189 02 27	9 02 27	Moras.....	1.194736	15.658	51.37	
Anacacho (U.S.G.S.), 1924.....	29 11 03.901 100 17 14.455	211 27 20	31 27 20	Anacacho.....	0.818556	6.585	21.60	

¹ No check on this position.

Red River boundary arc

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points							
Keele (Okla.), 1923	34 05 51.275	218 38 11.15	38 42 48.04	Monument	4.3055025	20,207.03	66,295.9
	98 03 06.266	271 49 45.65	91 55 17.57	Benton	4.1814609	15,186.61	49,824.7
		18 29 20.44	198 27 02.71	Cube	4.2997742	19,942.25	65,427.2
Hastings (Okla.), 1923	34 10 46.179	251 26 28.82	71 33 47.94	Monument	4.3239547	21,084.08	69,173.4
	98 07 54.297	320 53 42.66	140 56 24.30	Keele	4.0683979	11,705.71	38,404.5
		357 48 13.17	177 48 36.58	Cube	4.4474993	28,022.01	91,935.5
Byers, 1923	34 02 50.742	204 39 05.27	24 41 32.52	Hastings	4.2073788	16,120.51	52,888.7
	98 12 16.855	248 27 08.84	68 32 17.30	Keele	4.1811013	15,174.04	49,783.5
		329 38 44.69	149 41 34.83	Cube	4.1894906	15,470.01	50,754.5
Lee (Okla.), 1923	34 11 08.482	271 36 58.64	91 45 30.43	Hastings	4.3680474	23,337.13	76,565.2
	98 23 05.225	312 39 17.89	132 45 21.55	Byers	4.3543376	22,611.93	74,186.0
Bailer (Okla.), 1923	34 09 11.185	123 31 14.98	303 29 15.26	Lee	3.8160651	6,547.34	21,480.7
	98 19 32.064	260 38 40.58	80 45 12.45	Hastings	4.2579164	18,109.91	59,415.6
		316 23 03.08	136 27 07.08	Byers	4.2090287	16,181.87	53,090.0
Thornberry, 1923	34 03 30.476	187 27 48.96	7 28 29.46	Lee	4.1532845	14,232.61	46,694.8
	98 24 17.422	214 50 37.80	34 53 17.81	Bailer	4.1070212	12,794.44	41,976.4
		273 44 02.57	93 50 46.06	Byers	4.2676634	18,520.96	60,764.2
Willis (Okla.), 1923	34 05 28.738	223 59 55.03	44 03 36.68	Lee	4.1631466	14,559.51	47,767.3
	98 29 40.180	293 44 20.17	113 47 21.01	Thornberry	3.9562804	9,042.33	29,666.4
Gammill (Okla.), 1923	34 10 47.047	266 58 54.42	87 03 32.81	Lee	4.1040071	12,705.95	41,686.1
	98 31 20.726	321 04 55.38	141 08 52.82	Thornberry	4.2375598	17,280.64	56,694.9
		345 16 27.85	165 17 24.27	Willis	4.0060510	10,140.30	33,268.6
Cashion, 1923	34 01 16.974	178 56 20.14	358 56 13.01	Gammill	4.2447161	17,567.75	57,636.9
	98 31 08.023	196 11 15.09	16 12 04.27	Willis	3.9072850	8,077.65	26,501.4
		248 38 06.80	68 41 56.64	Thornberry	4.0533491	11,307.04	37,096.5
Sullivan, 1923	34 05 48.364	223 35 22.15	43 38 34.21	Gammill	4.1041988	12,711.56	41,704.5
	98 37 02.968	312 32 36.14	132 35 54.93	Cashion	4.0920324	12,360.40	40,552.4
Miller (Okla.), 1923	34 09 38.008	245 41 25.80	65 43 09.13	Gammill	3.7135063	5,170.19	16,962.5
	98 34 24.716	341 53 45.87	161 55 36.12	Cashion	4.2105901	16,240.15	53,281.2
		29 49 46.69	209 48 17.90	Sullivan	3.9114406	8,155.31	26,756.2

Grandfield (Okla.), 1923	34 13 15.000	287 26 33.38	107 31 51.06	Gammill	4.1810197	15,171.19	49,774.1
	98 40 45.904	304 22 52.19	124 26 26.41	Miller	4.0730175	11,830.89	38,815.2
		337 26 45.50	157 28 50.68	Sullivan	4.1731686	14,899.39	48,882.4
Sunshine, 1923	34 03 41.273	211 24 08.10	31 28 04.79	Grandfield	4.3163520	20,718.20	67,973.0
	98 47 47.645	256 37 18.66	76 43 19.90	Sullivan	4.2301045	16,986.52	55,729.9
Tipton (Okla.), 1923	34 09 13.567	226 29 58.41	46 32 50.57	Grandfield	4.0338897	10,811.59	35,471.0
	98 45 52.290	294 57 01.27	115 01 58.23	Sullivan	4.1750839	14,965.25	49,098.5
		16 06 59.19	196 05 54.51	Sunshine	4.0276258	10,656.77	34,963.1
Burke (Okla.), 1923	34 12 27.135	264 08 19.00	84 13 36.97	Grandfield	4.1628849	14,550.73	47,738.5
	98 50 11.400	311 55 49.30	131 58 14.87	Tipton	3.9504578	8,921.91	29,271.3
		347 10 52.95	167 12 13.62	Sunshine	4.2205270	16,616.02	54,514.4
Harrold, 1923	34 06 05.554	234 34 55.18	54 40 58.20	Burke	4.3077580	20,312.25	66,641.1
	99 00 58.005	282 18 43.64	102 26 06.54	Sunshine	4.3169243	20,745.52	68,062.6
Hickerson (Okla.), 1923	34 13 46.939	283 33 27.22	103 37 10.71	Burke	4.0197758	10,465.88	34,336.8
	98 56 48.825	323 20 50.61	143 25 54.37	Sunshine	4.3663898	23,248.22	76,273.5
		24 11 49.34	204 09 29.40	Harrold	4.1926519	15,583.03	51,125.3
Red Bluff, 1923	34 12 58.487	266 12 44.70	86 21 09.59	Hickerson	4.3622206	23,026.11	75,544.8
	99 11 46.538	307 23 51.09	127 29 55.24	Harrold	4.3206606	20,924.76	68,650.6
Frederick (Okla.), 1923	34 24 04.324	339 48 59.74	159 51 33.75	Hickerson	4.3067451	20,264.93	66,485.9
	99 01 22.014	358 56 21.60	178 56 35.11	Harrold	4.5217251	33,244.91	109,071.0
		37 56 41.41	217 50 49.39	Red Bluff	4.4149465	25,998.40	85,296.4
Harrison, 1923	34 19 31.996	252 57 22.89	73 07 30.70	Frederick	4.4588974	28,767.19	94,380.4
	99 19 18.832	316 18 20.09	136 22 34.78	Red Bluff	4.2242635	16,759.59	54,985.4
Cunningham (Okla.), 1923	34 24 29.636	276 28 39.75	96 31 11.23	Frederick	3.8382985	6,891.26	22,609.1
	99 05 50.095	23 11 48.51	203 08 27.58	Red Bluff	4.3648181	23,164.24	75,998.0
		66 07 54.44	246 00 17.91	Harrison	4.3542743	22,608.63	74,175.1
Hess (Okla.), 1923	34 28 24.110	288 07 54.19	108 16 53.27	Frederick	4.4085789	25,619.99	84,054.9
	99 17 15.269	292 23 17.97	112 29 45.48	Cunningham	4.2770501	18,925.62	62,091.8
		10 54 19.14	190 53 09.33	Harrison	4.2226379	16,696.98	54,780.0
Butte (Okla.), 1923	34 29 18.237	274 47 36.77	94 54 52.49	Hess	4.2946877	19,710.05	64,665.4
	99 30 04.912	317 32 17.83	137 38 22.91	Harrison	4.3885610	24,465.89	80,268.5
Whittle, 1923	34 21 31.803	191 09 43.49	11 10 46.32	Butte	4.1658313	14,649.79	48,063.5
	99 31 56.060	240 28 20.63	60 36 38.45	Hess	4.4121716	25,832.81	84,753.1
		280 44 21.37	100 51 28.55	Harrison	4.2945414	19,703.41	64,643.6
Green, 1923	34 22 52.206	241 50 28.07	61 58 41.66	Butte	4.4024627	25,261.71	82,879.5
	99 44 37.795	277 11 39.29	97 18 49.32	Whittle	4.2927052	19,620.28	64,370.9

Red River boundary arc—Continued

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U. S. COAST AND GEODETIC SURVEY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Eldorado (Okla.), 1923.....	° ' "	° ' "	° ' "				
	34 28 59.994	266 33 21.53	86 36 50.56	Butte.....	3.9748231	9,436.76	30,960.4
	99 36 14.092	334 28 23.37	154 30 49.23	Whittle.....	4.1847325	15,301.45	50,201.5
Campbell (Okla.), 1923.....		48 39 12.35	228 34 27.54	Green.....	4.2340459	17,141.38	56,238.0
	34 32 09.779	285 55 11.92	106 02 45.38	Eldorado.....	4.3271136	21,238.00	69,678.3
	99 49 34.486	336 11 23.62	156 14 11.49	Green.....	4.2735926	18,775.55	61,599.4
Gould (Okla.), 1923.....	34 40 22.747	325 41 44.71	145 47 03.79	Eldorado.....	4.4057700	25,454.82	83,513.0
	99 45 36.311	357 21 20.97	177 21 54.14	Green.....	4.5106161	32,405.31	106,316.4
		21 47 45.27	201 45 30.01	Campbell.....	4.2137218	16,357.68	53,666.8
Hollis (Okla.), 1923.....	34 37 35.601	253 10 17.73	73 16 39.18	Gould.....	4.2515187	17,845.09	58,546.8
	99 56 47.232	312 16 36.84	132 20 42.45	Campbell.....	4.1736111	14,914.58	48,932.3
Snider (Okla.), 1923.....	34 33 18.048	131 25 16.10	311 21 55.52	Hollis.....	4.0792636	12,002.28	39,377.5
	99 50 53.914	211 42 12.96	31 45 13.37	Gould.....	4.1871302	15,386.16	50,479.4
		316 04 53.57	136 05 38.61	Campbell.....	3.4653939	2,920.07	9,580.3
Day (Okla.), 1923.....	34 46 59.711	326 23 50.50	146 26 52.32	Gould.....	4.1667898	14,682.16	48,169.7
	99 50 55.474	27 16 32.79	207 13 12.52	Hollis.....	4.2912006	19,552.42	64,148.2
		142 08 58.15	322 03 08.80	Coon.....	4.4024717	25,262.23	82,881.2
		163 33 19.37	343 31 44.61	Vinson.....	4.1723645	14,871.83	48,792.0
Henry (Okla.), 1923.....	34 47 30.356	124 35 56.28	304 28 08.83	Branson.....	4.4017548	25,220.56	82,744.5
	99 58 51.610	169 47 12.45	349 45 55.33	Coon.....	4.2854760	19,296.39	63,308.2
		210 35 44.02	30 38 41.34	Vinson.....	4.1896630	15,476.15	50,774.7
		274 25 22.16	94 29 53.81	Day.....	4.0842892	12,141.97	39,835.8
		303 00 39.48	123 08 12.59	Gould.....	4.3828327	24,145.31	79,216.7
		350 11 29.73	170 12 40.55	Hollis.....	4.2694753	18,598.39	61,018.2
Supplementary points							
Ryan, city water tank (Okla.), 1923.....	34 01 31.896	95 56 48.9	275 48 13.8	Byers.....	4.375329	23,731.7	77,860
	97 56 56.575	130 09 30.4	310 06 03.4	Keele.....	4.043407	12,399.6	40,681
		217 15 23.9	37 17 28.6	Benton.....	3.973982	9,418.5	30,901
Ryan, high school cupola (Okla.), 1923.....	34 01 29.344	96 08 35.3	276 00 00.8	Byers.....	4.374947	23,710.8	77,791
	97 56 57.717	130 31 21.2	310 27 54.8	Keele.....	4.094407	12,428.2	40,775
		217 06 35.8	37 08 41.1	Benton.....	3.977673	9,498.9	31,164

Waurika, city water tank (Okla.), 1923.....	34 09 47.242 97 59 52.791	222 01 02.8 307 13 06.8 34 18 14.3	42 03 51.3 127 16 50.5 214 16 25.7	Monument..... Benton..... Keele.....	4.058890 4.106320 3.944476	11,452.2 12,832.8 8,799.9	37,573 42,102 28,871
Byers, city water tank, 1923.....	34 04 10.226 98 11 18.300	31 31 10.2 203 10 45.9 338 13 03.1	211 30 37.4 23 12 40.3 158 15 20.5	Byers..... Hastings..... Cube.....	3.458297 4.122962 4.230814	2,872.7 13,272.8 17,014.3	9,425 43,546 55,821
Hastings, high school cupola (Okla.), 1923.....	34 13 50.005 98 06 30.073	266 39 19.0 340 29 42.7 20 50 51.7 79 01 26.2	86 45 51.0 160 31 37.1 200 50 04.3 258 52 06.7	Monument..... Keele..... Hastings..... Lee.....	4.251949 4.194431 3.782516 4.414266	17,862.8 15,647.0 6,060.6 25,957.7	58,605 51,335 19,884 85,163
Hastings city water tank (Okla.), 1923.....	34 13 52.158 98 06 31.281	266 52 22.6 340 28 10.2 20 21 19.7 78 52 01.1	86 58 55.3 160 30 05.3 200 20 33.0 258 42 42.3	Monument..... Keele..... Hastings..... Lee.....	4.252607 4.196448 3.786169 4.413971	17,889.9 15,719.8 6,111.8 25,940.1	58,694 51,574 20,062 85,105
Temple, city water tank (Okla.), 1923.....	34 16 26.525 98 14 20.568	316 39 27.1 352 48 17.8 30 45 14.2 53 55 09.4	136 43 04.4 172 49 27.3 210 42 19.1 233 50 14.4	Hastings..... Byers..... Bailer..... Lee.....	4.158753 4.403715 4.193258 4.220722	14,412.3 25,334.7 15,604.8 16,623.5	47,284 83,119 51,197 54,539
Petrolia, high school cupola, 1923.....	34 00 38.678 98 13 36.796	150 03 02.4 206 44 33.6 313 13 39.2	329 59 43.7 26 45 18.3 133 17 13.9	Bailer..... Byers..... Cube.....	4.260778 3.658644 4.131848	18,229.6 4,556.6 13,547.2	59,808 14,949 44,446
Walters, city water tank (Okla.), 1923.....	34 21 23.994 98 18 44.307	3 06 04.8 19 24 33.2 44 39 17.9	183 05 37.9 199 22 06.3 224 32 11.9	Bailer..... Lee..... Gammill.....	4.354348 4.303316 4.440299	22,612.5 20,105.6 27,561.3	74,188 65,963 90,424
Iowa Park, city water tank, 1923 ¹	33 57 04.00 98 39 58.80	135 31 49 240 11 02	315 27 26 60 15 59	Sunshine..... Cashion.....	4.234598 4.195777	17,163.2 15,695.6	56,310 51,495
Wichita Falls, City Power and Electric Co., stack, 1923.	33 53 48.546 98 29 08.589	122 31 59.8 167 29 43.9 177 51 00.8 202 36 24.1	302 21 34.4 347 28 37.2 357 50 43.1 22 39 06.8	Sunshine..... Cashion..... Willis..... Thornberry.....	4.531979 4.150836 4.334228 4.288365	34,039.2 14,152.6 21,588.8 19,425.2	111,677 46,432 70,829 63,731
Wichita Falls, State Hospital, water tank, 1923.	33 50 39.566 98 31 27.198	133 48 29.4 185 43 06.7 204 53 12.9	313 39 21.7 5 44 06.5 24 57 12.9	Sunshine..... Willis..... Thornberry.....	4.542086 4.430861 4.418147	34,840.6 27,533.5 26,190.7	114,306 90,333 85,927
Wichita Falls, Call Aviation Field, water tank, 1923.	33 52 20.174 98 33 04.816	132 51 52.9 192 11 00.0 213 12 30.2	312 43 39.6 12 12 54.4 33 17 24.8	Sunshine..... Willis..... Thornberry.....	4.489791 4.395459 4.392614	30,888.1 24,857.6 24,695.3	101,339 81,554 81,021

¹ No check on this position.

TRIANGULATION IN TEXAS

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
Burkburnett, city water tank, 1923.....	34 05 52.990	179 18 43.5	359 18 42.3	Miller.....	3.840961	6,933.6	22,748	
	98 34 21.467	207 03 27.7	27 05 09.1	Gammill.....	4.007542	10,175.2	33,383	
		275 53 40.2	95 56 17.9	Willis.....	3.860294	7,249.3	23,784	
		285 46 56.1	105 52 34.6	Thornberry.....	4.206767	16,097.8	52,814	
		329 43 42.4	149 45 31.0	Cashion.....	3.993240	9,845.6	32,302	
Devol, city water tank (Okla.), 1923.....	34 11 27.261	271 41 59.5	91 48 53.4	Lee.....	4.275712	18,867.4	61,901	
	98 35 21.706	281 20 05.4	101 22 20.8	Gammill.....	3.798926	6,294.0	20,650	
		336 33 18.9	156 33 51.0	Miller.....	3.564555	3,669.1	12,038	
		13 57 38.1	193 56 41.3	Sullivan.....	4.031788	10,759.4	35,300	
Sunshine (U.S.G.S.), 1923 ¹	34 03 41.37 98 47 47.48	54 27 07	234 27 07	Sunshine.....	0.706376	5.086	16.69	
Sullivan (U.S.G.S.), 1923 ¹	34 05 48.11 98 37 02.10	109 18 14	289 18 14	Sullivan.....	1.374748	23.700	77.76	
Grandfield, city water tank (Okla.), 1923.....	34 13 28.570	312 24 39.8	132 24 49.9	Grandfield.....	2.792358	620.0	2,034	
	98 41 03.786	43 15 27.8	223 12 45.7	Tipton.....	4.032806	10,784.6	35,382	
		82 21 07.8	262 15 59.9	Burke.....	4.150602	14,145.0	46,407	
Grandfield, city high school (Okla.), 1923.....	34 13 41.117	334 26 25.3	154 26 33.8	Grandfield.....	2.950353	892.0	2,927	
	98 41 00.939	42 09 59.4	222 07 15.7	Tipton.....	4.046032	11,118.1	36,477	
		80 51 12.5	260 46 03.0	Burke.....	4.154531	14,273.5	46,829	
Chattanooga, city water tank (Okla.), 1923.....	34 25 13.289	335 06 31.0	155 11 03.4	Gammill.....	4.468573	29,415.3	96,507	
	98 39 24.185	35 04 49.7	214 58 44.8	Burke.....	4.459836	28,829.4	94,584	
		86 29 25.4	266 17 02.2	Frederick.....	4.527926	33,723.0	110,640	
Electra, city water tank, 1923.....	34 01 46.882	131 13 38.4	311 10 19.6	Harrold.....	4.082780	12,099.8	39,697	
	98 55 02.975	173 02 17.8	353 01 18.4	Hickerson.....	4.349302	22,351.3	73,331	
		225 41 04.9	45 46 13.7	Tipton.....	4.294812	19,715.7	64,684	
		252 26 52.3	72 30 56.1	Sunshine.....	4.068518	11,709.0	38,415	
Vernon, city water tank, 1923 ¹	34 08 55.37	170 33 38	350 32 25	Harrison.....	4.298537	19,885.5	65,241	
	99 17 11.26	227 57 40	48 00 42	Red Bluff.....	4.048900	11,191.8	36,718	
Frederick, city water tank (Okla.), 1923.....	34 23 22.661	39 31 58.2	219 26 09.0	Red Bluff.....	4.396527	24,918.8	81,754	
	99 01 26.902	185 33 21.6	5 33 24.4	Frederick.....	3.110620	1,289.8	4,232	
		338 08 10.6	158 10 47.4	Hickerson.....	4.281291	19,141.3	62,701	
		358 40 19.7	178 40 36.0	Harrold.....	4.504602	31,964.1	104,869	
Olustee, city water tank (Okla.), 1923.....	34 32 53.608	304 08 11.1	124 12 42.8	Hess.....	4.169785	14,783.8	48,503	
	99 25 14.763	339 46 24.2	159 49 45.5	Harrison.....	4.420265	26,318.7	86,347	
		26 01 28.8	205 57 41.8	Whittle.....	4.368711	23,372.8	76,682	
		48 08 20.6	228 05 36.2	Butte.....	3.997400	9,940.3	32,612	
Altus, city water tank (Okla.), 1923.....	34 39 07.224	347 31 52.4	167 33 29.8	Hess.....	4.307376	20,294.4	66,583	
	99 20 06.968	358 03 13.4	178 03 40.6	Harrison.....	4.559111	36,233.6	118,876	
		29 08 22.7	209 01 41.0	Whittle.....	4.570699	37,213.4	122,091	
		40 04 16.6	219 58 37.3	Butte.....	4.374750	23,700.1	77,756	
Eldorado, U.S. Gypsum Co., water tank (Okla.), 1923.....	34 28 48.206	264 26 02.7	84 27 25.6	Eldorado.....	3.574347	3,752.7	12,312	
	99 38 40.468	322 26 39.9	142 30 28.5	Whittle.....	4.229293	16,954.8	55,626	
		39 46 44.9	219 43 22.9	Green.....	4.154355	14,267.7	46,810	
Louis, high school cupola (Okla.), 1923.....	34 33 41.685	33 49 57.0	213 49 14.8	Campbell.....	3.532632	3,409.0	11,184	
	99 48 20.055	79 29 34.4	259 28 07.2	Snider.....	3.600919	3,989.5	13,089	
		198 38 20.7	18 39 53.8	Gould.....	4.115390	13,043.4	42,793	
Gould, high school, north chimney (Okla.), 1923.....	34 39 58.435	74 50 45.2	254 44 43.7	Hollis.....	4.224847	16,782.1	55,059	
	99 46 11.323	150 54 28.8	330 51 47.0	Day.....	4.171966	14,858.9	48,750	
		229 57 09.0	49 57 29.0	Gould.....	3.066104	1,164.4	3,820	
Hollis, city water tank (Okla.), 1923.....	34 40 47.244	29 46 18.3	209 45 03.1	Hollis.....	3.832676	6,802.6	22,318	
	99 54 34.629	139 09 19.8	319 05 52.7	Dodson.....	4.150309	14,135.4	46,376	
		152 15 45.1	332 13 18.7	Henry.....	4.147276	14,037.1	46,053	
		205 53 31.9	25 55 36.8	Day.....	4.105851	12,760.0	41,863	
	273 06 36.6	93 11 42.9	Gould.....	4.137518	13,725.2	45,030		
Quanah, courthouse cupola, 1923.....	34 17 50.125	177 46 57.5	357 46 49.5	Green.....	3.969178	9,314.9	30,561	
	99 44 23.688	211 10 28.3	31 15 04.9	Eldorado.....	4.382630	24,134.0	79,180	
		225 54 27.4	46 02 32.5	Butte.....	4.484423	30,508.7	100,094	
		250 16 30.9	70 23 32.5	Whittle.....	4.307415	20,296.2	66,588	
Quanah, city water tank, 1923.....	34 17 56.731	135 46 49.2	315 39 41.4	Elroy.....	4.442721	27,715.4	90,930	
	99 44 17.454	162 54 20.4	342 51 21.2	Campbell.....	4.439388	27,503.5	90,234	
		211 06 03.8	31 10 36.9	Eldorado.....	4.377987	23,877.4	78,338	
		225 58 31.5	46 06 32.3	Butte.....	4.480762	30,252.6	99,254	
		250 40 10.3	70 47 07.6	Whittle.....	4.302717	20,077.8	65,872	
Herg, 1923.....	34 21 02.401	183 16 51.2	3 17 09.1	Elroy.....	4.150604	14,145.0	46,407	
	99 57 26.630	260 10 05.1	80 17 19.1	Green.....	4.299613	19,934.9	65,408	
Hardeman, 1923.....	34 21 59.696	199 27 40.1	19 29 16.8	Elroy.....	4.117478	13,106.2	42,999	
	99 59 46.021	296 21 08.5	116 22 27.2	Herg.....	3.599399	3,975.6	13,043	

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Elroy, 1923.....	34 28 40.709	240 08 06.7	60 12 16.2	Campbell.....	4.112300	12,950.9	42,490
	99 56 54.907	268 49 37.9	89 01 20.4	Eldorado.....	4.500623	31,668.2	103,898
		299 38 58.4	119 45 55.2	Green.....	4.335834	21,668.8	71,092
Red River longitude, 1923.....	34 22 18.267	204 02 07.9	24 04 04.3	Elroy.....	4.110744	12,904.6	42,338
	100 00 20.879	302 43 02.9	122 43 22.6	Hardeman.....	3.024750	1,058.6	3,473
Initial, 1923.....	34 34 39.849	228 34 45.6	48 37 02.4	Hollis.....	3.913225	8,188.9	26,866
	100 00 48.295	279 23 53.9	99 29 31.1	Snider.....	4.186388	15,359.9	50,393
Closky, 1923.....	34 34 46.314	224 05 31.8	44 07 24.5	Hollis.....	3.861226	7,264.8	23,835
	100 00 05.676	280 54 03.3	100 59 16.4	Snider.....	4.156114	14,325.6	47,000
		79 36 40.5	259 36 16.4	Initial.....	3.043120	1,104.4	3,623
Kidder monument (1902), 1923.....	34 34 39.797	90 05 03.6	270 04 38.6	Initial.....	3.052020	1,127.2	3,698
	100 00 04.069	168 28 06.2	348 28 07.3	Closky.....	2.311627	204.9	672
Line, 1923.....	34 40 51.452	193 00 40.9	13 01 44.6	Henry.....	4.100936	12,616.4	41,392
	100 00 43.343	232 45 50.8	52 51 25.8	Day.....	4.273548	18,773.6	61,593
		272 07 19.3	92 15 55.4	Gould.....	4.363760	23,107.9	75,813
Dodson, 1923.....	34 46 34.114	296 26 01.7	116 34 35.5	Gould.....	4.408952	25,642.0	84,127
	100 00 38.203	340 28 32.0	160 30 43.5	Hollis.....	4.245621	17,604.4	57,757
		0 42 36.9	180 42 34.0	Line.....	4.023655	10,559.8	34,645
Otex, 1923.....	34 57 39.170	76 19 53.9	256 13 01.4	Branson.....	4.274413	18,811.0	61,716
	100 00 29.388	103 41 33.3	283 41 12.0	Coon.....	2.986039	968.4	3,177
		297 41 30.1	117 45 23.7	Vinson.....	4.068155	11,699.2	38,383
		323 27 48.7	143 33 16.7	Day.....	4.389349	24,510.3	80,414
		352 27 08.1	172 28 04.0	Henry.....	4.277023	18,924.4	62,088
Texas-Oklahoma boundary, north range line 12/13, secs. 25/30 (Okla.), 1923.	34 05 57.676	8 22 19.9	188 21 52.1	Cashion.....	3.941603	8,741.8	28,680
	98 30 18.412	137 06 24.0	317 04 05.8	Miller.....	3.967045	9,269.3	30,411
		312 17 30.9	132 17 52.3	Willis.....	3.122204	1,325.0	4,347
Texas-Oklahoma boundary, reference mark no. 2, 1923.	34 05 31.921	149 41 56.3	329 40 19.2	Miller.....	3.943657	8,783.3	28,817
	98 31 31.708	271 57 20.2	91 58 22.7	Willis.....	3.456480	2,960.8	9,386
		355 34 35.0	175 34 48.2	Cashion.....	3.896452	7,878.7	25,849
Texas-Oklahoma boundary, sec. 14, witness point (Okla.), 1923.	34 07 36.631	133 48 13.7	313 46 48.3	Miller.....	3.732718	5,404.0	17,730
	98 31 52.453	187 53 03.5	7 53 21.3	Gammill.....	3.772545	5,923.0	19,432
		319 16 59.9	139 18 14.1	Willis.....	3.715854	5,198.2	17,054
		354 26 02.8	174 26 27.7	Cashion.....	4.070151	11,753.1	38,560
Texas-Oklahoma boundary, reference mark no. 4, 1923.	34 07 00.566	172 19 02.9	352 18 48.5	Miller.....	3.689754	4,895.0	16,060
	98 33 59.169	210 10 22.4	30 11 51.3	Gammill.....	3.907030	8,072.9	26,486
		293 03 51.0	113 06 16.2	Willis.....	3.858304	7,216.1	23,675
		337 28 13.6	157 29 49.5	Cashion.....	4.059186	11,460.0	37,598
Texas-Oklahoma boundary, reference mark no. 7, 1923.	34 08 13.877	145 17 50.3	325 15 29.2	Grandfield.....	4.052630	11,288.3	37,035
	98 36 34.828	239 34 51.6	59 37 48.0	Gammill.....	3.969781	9,327.8	30,603
		232 07 05.8	52 08 18.9	Miller.....	3.625579	4,222.6	13,854
Texas-Oklahoma boundary, secs. 34/35, quarter corner (Okla.), 1923.	34 09 58.525	275 29 07.6	95 31 31.4	Miller.....	3.818834	6,589.2	21,618
	98 38 40.782	314 58 14.5	134 59 25.2	Texas-Oklahoma boundary, reference mark no. 7.	3.659110	4,561.5	14,966
Texas-Oklahoma boundary, reference mark no. 12, 1923.	34 08 04.914	104 52 45.4	284 49 50.6	Tipton.....	3.916503	8,250.9	27,070
	98 40 40.999	179 14 49.5	359 14 46.7	Grandfield.....	3.980237	9,555.1	31,349
		253 23 59.9	73 27 31.1	Miller.....	4.002492	10,057.5	32,997
		306 57 39.4	126 59 41.6	Sullivan.....	3.844761	6,994.6	22,948
Texas-Oklahoma boundary, north range line 15/14 (Okla.), 1923.	34 08 41.244	39 30 47.7	219 28 01.1	Sunshine.....	4.078322	11,976.3	39,292
	98 42 50.506	102 05 06.4	282 03 24.4	Tipton.....	3.677813	4,762.3	15,624
		200 42 40.1	20 43 50.1	Grandfield.....	3.955122	9,018.2	29,587
		262 16 22.8	82 21 06.8	Miller.....	4.116421	13,074.4	42,895
		288 37 57.7	108 39 10.4	Texas-Oklahoma boundary, reference mark no. 12.	3.544296	3,501.8	11,489
Texas-Oklahoma boundary, reference mark no. 15, 1923.	34 06 47.474	143 25 47.1	323 24 33.9	Tipton.....	3.748618	5,605.5	18,391
	98 43 41.913	200 35 27.7	20 35 56.5	Texas-Oklahoma boundary, north range line 15/14.	3.573429	3,744.8	12,286
		270 40 12.9	20 41 51.7	Grandfield.....	4.105954	12,763.0	41,873
		242 45 08.3	62 46 49.8	Texas-Oklahoma boundary, reference mark no. 12.	3.717175	5,214.0	17,106
		280 04 04.0	100 07 47.6	Sullivan.....	4.016467	10,386.4	34,076
Texas-Oklahoma boundary, sec. 10, witness corner (Okla.), 1923.	34 08 33.756	18 03 07.4	198 02 03.2	Sunshine.....	3.976712	9,477.9	31,095
	98 45 53.117	137 24 35.5	317 22 10.4	Burke.....	3.989915	9,770.5	32,055
		180 59 20.6	0 59 21.1	Tipton.....	3.088774	1,226.8	4,025
		314 14 11.0	134 15 24.6	Texas-Oklahoma boundary, reference mark no. 15.	3.671480	4,693.3	15,398
Texas-Oklahoma boundary, reference mark no. 16, 1923.	34 07 10.503	23 45 57.1	203 44 55.1	Sunshine.....	3.847788	7,043.5	23,109
	98 45 56.958	182 11 48.3	2 11 50.5	Texas-Oklahoma boundary, sec. 10, witness corner.	3.409437	2,567.1	8,422
		239 38 54.1	59 40 38.7	Texas-Oklahoma boundary, north range line 15/14.	3.743155	5,535.5	18,161
		281 34 33.6	101 35 49.4	Texas-Oklahoma boundary, reference mark no. 15.	3.548132	3,532.9	11,591

Red River boundary arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Texas-Oklahoma boundary, sec. 6, witness corner (Okla.), 1923.	34 09 31.803	120 56 33.7	300 51 45.5	Hickerson.....	4.184882	15,306.7	50,219
	98 48 15.875	151 18 13.0	331 17 08.1	Burke.....	3.789530	6,159.3	20,208
		278 40 28.7	98 41 49.3	Tipton.....	3.570627	3,720.7	12,207
Texas-Oklahoma boundary, reference mark no. 21, 1923.	34 08 33.864	70 34 11.8	250 29 28.8	Harrold.....	4.137045	13,710.2	44,981
	98 52 33.589	320 51 58.7	140 54 39.0	Sunshine.....	4.065155	11,618.6	38,119
Texas-Oklahoma boundary, reference mark no. 18, 1923.	34 07 50.500	104 08 01.9	284 06 05.7	Texas-Oklahoma boundary, reference mark no. 21.	3.738612	5,477.9	17,972
	98 49 06.250			Burke.....	3.938791	8,685.4	28,495
		168 55 43.1	348 55 06.5	Tipton.....	3.747386	5,589.7	18,339
		242 44 03.1	62 45 52.0	Sunshine.....	3.899764	7,939.0	26,047
Texas-Oklahoma boundary, sec. 35, witness point (Okla.), 1923.	34 09 59.901	65 52 06.7	245 46 14.5	Harrold.....	4.246201	17,627.9	57,834
	98 50 30.386	186 06 55.4	6 07 06.1	Burke.....	3.659207	4,562.5	14,969
		284 05 41.0	104 06 56.5	Texas-Oklahoma boundary, sec. 6, witness corner.	3.550530	3,552.5	11,655
		340 18 52.0	160 20 23.3	Sunshine.....	4.093044	12,389.2	40,647
Texas-Oklahoma boundary, sec. 29, witness point (Okla.), 1923.	34 10 47.280	53 39 12.7	233 34 54.6	Harrold.....	4.165361	14,633.9	48,011
	98 53 18.163	237 13 41.9	57 15 26.9	Burke.....	3.754829	5,686.3	18,656
		327 08 25.1	147 11 30.5	Sunshine.....	4.193723	15,621.5	51,252
Texas-Oklahoma boundary, north range line 17/16 (Okla.), 1923.	34 11 24.907	41 00 54.8	220 57 47.5	Harrold.....	4.115135	13,035.7	42,768
	98 55 24.255	256 30 50.7	76 33 46.6	Burke.....	3.915734	8,236.3	27,022
		289 44 30.2	109 45 41.1	Texas-Oklahoma boundary, sec. 29, witness point.	3.535384	3,430.7	11,256
		320 38 39.9	140 42 56.1	Sunshine.....	4.266361	18,465.5	60,582
Texas-Oklahoma boundary mark, 1921.....	34 57 28.421	120 50 31.9	300 50 10.7	Coon.....	3.038704	1,093.2	3,587
	100 00 29.476	180 23 10.4	0 23 10.5	Otex.....	2.520150	331.2	1,087
Texas-Oklahoma old boundary and T 1 N., R. 27 W., secs. 2/11, corner, 1923. ¹	34 34 46.56	359 47 14	179 47 14	Initial.....	2.315698	206.87	678.7
	100 00 48.32						
Texas-Oklahoma old boundary and Tps. 2/3 N., R. 27 W., secs. 2/35, corner, 1923. ¹	34 40 54.05	0 40 20	180 40 20	Line.....	1.903307	80.04	262.6
	100 00 43.31						

One-hundredth meridian boundary arc

Principal points	°	'	"	°	'	"	°	'	"				
Fuller, 1927.....	35	09	01.872	274	26	01.22	94	35	21.58	Self.....	4.3930607	24,720.70	81,104.5
	100	05	04.205	343	50	06.12	163	52	22.68	Coon.....	4.3357318	21,663.66	71,074.9
				326	46	23.34	146	52	55.34	Vinson.....	4.5001931	31,636.84	103,796.2
Mayfield (Okla.), 1927.....	35	20	02.226	337	42	03.61	157	45	31.92	Self.....	4.3818704	24,091.86	79,041.4
	99	54	51.764	37	19	00.32	217	13	06.92	Fuller.....	4.4077580	25,571.61	83,896.2
Wheeler, 1927.....	35	24	33.123	288	30	00.43	108	39	29.98	Mayfield.....	4.4183386	26,202.25	85,965.2
	100	11	15.659	311	55	30.99	132	08	26.74	Self.....	4.6605457	45,766.29	150,151.6
				341	51	26.51	161	55	01.05	Fuller.....	4.4799354	30,195.03	99,064.9
Rankin (Okla.), 1927.....	35	33	00.599	353	32	43.76	173	33	46.06	Mayfield.....	4.3827502	24,140.72	79,201.7
	99	56	39.219	54	46	40.92	234	38	12.22	Wheeler.....	4.4324843	27,069.75	88,811.3
Sockwell, 1927.....	35	33	08.762	272	14	58.12	92	17	24.63	Rankin.....	4.8028864	6,351.65	20,838.7
	100	00	51.199	339	27	57.56	159	31	25.99	Mayfield.....	4.4129533	25,879.35	84,905.8
				44	46	49.33	224	40	46.87	Wheeler.....	4.3496347	22,368.39	73,387.0
Zyback, 1927.....	35	36	19.400	297	57	30.83	118	01	57.14	Rankin.....	4.1156900	13,052.39	42,822.7
	100	04	16.946	318	34	47.27	138	36	46.98	Sockwell.....	4.8939264	7,832.97	25,698.7
				25	53	49.17	205	49	45.98	Wheeler.....	4.3836237	24,189.32	79,361.1
Provines (Okla.), 1927.....	35	40	56.317	357	08	52.62	177	09	09.51	Rankin.....	4.1667069	14,679.35	48,160.5
	99	57	08.218	51	40	55.77	231	36	45.93	Zyback.....	4.1384304	13,754.04	45,124.7
Hanna (Okla.), 1927.....	35	39	34.983	238	40	29.41	58	42	04.96	Provines.....	4.6833441	4,823.30	15,824.4
	99	59	52.068	338	12	51.92	158	14	44.20	Rankin.....	4.1168726	13,087.98	42,939.5
				47	53	41.38	227	51	07.07	Zyback.....	4.9535784	8,986.25	29,482.4
Hext, 1927.....	35	40	48.254	268	51	19.82	88	56	19.20	Provines.....	4.1109083	12,909.47	42,353.8
	100	05	41.494	284	22	57.27	104	26	21.02	Hanna.....	4.9577767	9,073.54	29,788.8
				345	35	43.85	165	36	33.12	Zyback.....	4.9321972	8,554.55	28,066.1
Gem, 1927.....	35	47	34.115	312	46	15.67	132	51	23.25	Provines.....	4.2562284	18,039.66	59,185.1
	100	05	54.838	358	27	48.15	178	27	55.94	Hext.....	4.0973633	12,513.05	41,053.2
Antelope (Okla.), 1927.....	35	54	15.561	14	02	02.65	193	59	39.45	Provines.....	4.4046363	25,388.46	83,295.3
	99	53	03.393	37	28	56.15	217	21	32.77	Hext.....	4.4959449	31,328.88	102,784.8
				57	28	44.45	237	21	12.65	Gem.....	4.3612535	22,974.89	75,376.8
Daly (Okla.), 1927.....	36	01	07.905	324	20	27.36	144	23	58.95	Antelope.....	4.1941245	15,635.96	51,299.0
	99	59	06.885	22	13	20.32	302	09	19.20	Gem.....	4.4527690	27,087.51	88,869.6

1 No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
Principal points—Continued													
Starbuck, 1927.....	°	'	"	°	'	"	°	'	"				
	36	03	36.698	293	08	10.67	113	12	24.36	Daly.....	4.0665101	11,654.94	38,237.9
	100	06	14.900	311	01	49.93	131	09	34.97	Antelope.....	4.4201453	26,311.48	86,323.6
				359	01	37.54	179	01	49.31	Gem.....	4.4723445	29,671.84	97,348.4
Santa (Okla.), 1927.....	36	07	58.631	341	02	46.45	161	06	10.72	Antelope.....	4.4284229	26,817.78	87,984.7
	99	58	50.744	1	49	42.86	181	49	35.23	Daly.....	4.1026275	12,665.65	41,553.9
				54	02	01.80	233	57	40.13	Starbuck.....	4.1378012	13,734.13	45,059.4
Corn, 1927.....	36	08	45.036	281	47	45.63	101	50	26.86	Santa.....	3.8440723	6,983.49	22,911.7
	100	03	24.141	24	12	54.64	204	11	14.02	Starbuck.....	4.0178357	10,419.23	34,183.8
Moreland, 1927.....	36	11	57.585	300	53	57.00	120	58	47.11	Santa.....	4.1561008	14,325.20	46,998.6
	100	07	02.348	317	24	10.57	137	26	19.37	Corn.....	3.9063230	8,059.78	26,442.8
				355	36	05.48	175	36	33.46	Starbuck.....	4.1898771	15,483.78	50,799.7
Apple (Okla.), 1927.....	36	14	46.202	11	44	01.26	191	42	59.65	Santa.....	4.1082236	12,829.91	42,092.8
	99	57	06.395	40	19	19.55	220	15	36.48	Corn.....	4.1641767	14,594.08	47,880.7
				70	48	04.11	250	42	11.95	Moreland.....	4.1970066	15,765.46	51,723.8
Follett, 1927.....	36	25	40.294	321	34	24.06	141	40	43.36	Apple.....	4.4102097	25,716.37	84,371.1
	100	07	46.535	357	30	26.28	177	30	52.45	Moreland.....	4.4045280	25,382.13	83,274.5
Catesby south base (Okla.), 1927.....	36	25	16.582	2	40	10.78	182	39	49.27	Apple.....	4.2889465	19,451.21	63,816.2
	99	56	30.109	32	41	24.18	212	35	09.79	Moreland.....	4.4660555	29,245.26	95,948.8
				92	32	21.88	272	25	40.24	Follett.....	4.2270220	16,866.39	55,335.8
Larkey, 1927.....	36	29	36.054	321	15	47.10	141	18	20.09	Catesby south base.....	4.0107351	10,250.26	33,629.4
	100	00	47.575	55	10	23.43	235	06	14.45	Follett.....	4.1042666	12,713.54	41,711.0
Flat Top (Okla.), 1927.....	36	34	56.750	336	57	17.11	157	00	18.73	Catesby south base.....	4.2884786	19,430.26	63,747.4
	100	01	35.426	353	07	48.17	173	08	16.66	Larkey.....	3.9981081	9,956.53	32,665.7
				28	19	47.87	208	16	07.10	Follett.....	4.2895963	19,480.33	63,911.7
Catesby north base (Okla.), 1927.....	36	29	36.236	26	21	57.85	206	20	23.24	Catesby south base.....	3.9509341	8,931.70	29,303.4
	99	53	50.885	70	48	12.31	250	39	55.71	Follett.....	4.3432450	22,041.70	72,315.1
				90	00	12.12	269	56	04.31	Larkey.....	4.0158231	10,371.06	34,025.7
				130	34	04.16	310	29	27.60	Flat Top.....	4.1819299	15,203.02	49,878.6

Martin (Okla.), 1927.....	35 04 27.970	333 00 31.94	153 03 59.46	Vinson.....	4.3062160	20,240.26	66,404.9
	99 59 43.179	9 41 44.25	189 40 56.45	Coon.....	4.0985551	12,547.44	41,166.1
		136 06 04.70	316 03 00.04	Fuller.....	4.0688913	11,719.02	38,448.2
Breaks (Okla.), 1927.....	35 10 06.483	342 03 04.58	162 06 33.14	Vinson.....	4.4760153	29,923.70	98,174.7
	99 59 44.571	5 12 25.75	185 11 38.70	Coon.....	4.3597316	22,894.52	75,113.1
		76 11 53.36	256 08 49.29	Fuller.....	3.9207019	8,331.09	27,332.9
Texola (Okla.), 1927.....	35 14 16.788	137 49 48.16	317 43 13.57	Wheeler.....	4.4090824	25,649.71	84,152.4
	99 59 53.201	215 33 39.50	35 36 33.63	Mayfield.....	4.1169422	13,090.08	42,946.4
Addis (Okla.), 1927.....	35 20 15.664	0 37 08.86	180 37 06.13	Texola.....	4.0437667	11,060.30	36,287.0
	99 59 48.473	114 38 05.62	294 31 27.81	Wheeler.....	4.2804613	19,074.86	62,581.4
		273 08 22.09	93 11 13.70	Mayfield.....	3.8753316	7,504.67	24,621.6
Dune (Okla.), 1927.....	35 24 09.059	92 29 59.18	272 23 20.30	Wheeler.....	4.2402504	17,388.03	57,047.2
	99 59 47.175	174 27 45.08	354 27 07.93	Sockwell.....	4.2230005	16,710.93	54,825.8
		196 07 05.10	16 08 54.19	Rankin.....	4.2317958	17,052.80	55,947.4
		315 32 40.49	135 35 31.48	Mayfield.....	4.0274557	10,652.60	34,949.4
Lake (Okla.), 1927.....	35 32 02.167	144 02 48.73	324 02 14.37	Sockwell.....	3.4040665	2,535.52	8,318.6
	99 59 52.094	249 38 50.23	69 40 42.35	Rankin.....	3.7144586	5,181.54	16,999.8
Locust (Okla.), 1927.....	35 42 46.074	67 29 14.75	247 25 51.71	Hext.....	3.9764604	9,472.41	31,077.4
	99 59 53.515	134 23 22.69	314 19 51.58	Gem.....	4.1037038	12,697.08	41,657.0
		205 49 10.77	25 53 10.73	Antelope.....	4.3731593	23,613.44	77,471.8
Washita (Okla.), 1927.....	35 49 16.254	70 57 44.77	250 54 12.54	Gem.....	3.9839086	9,636.26	31,615.0
	99 59 52.086	227 59 29.56	48 03 29.00	Antelope.....	4.1396548	13,792.88	45,252.1
		345 01 35.76	165 03 11.50	Provines.....	4.2027213	15,948.55	52,324.5
Canadian (Okla.), 1927.....	35 56 44.711	28 03 35.22	206 00 04.21	Gem.....	4.2838602	19,224.73	63,073.1
	99 59 54.716	188 23 55.69	8 24 25.67	Daly.....	3.9138123	9,199.97	30,183.6
		293 59 34.49	114 03 35.83	Antelope.....	4.0527025	11,290.22	37,041.3
Stucker (Okla.), 1927.....	36 02 25.674	102 49 11.73	282 45 24.98	Starbuck.....	3.9951728	9,889.47	32,445.7
	99 59 49.599	188 09 37.73	8 10 12.39	Santa.....	4.0156981	10,367.36	34,013.6
		335 57 06.22	155 57 33.21	Daly.....	3.4190802	2,624.70	8,611.2
Mussetter (Okla.), 1927.....	36 07 33.504	242 30 00.62	62 30 35.71	Santa.....	3.2246715	1,677.53	5,503.7
	99 59 50.253	354 46 44.19	174 47 11.60	Daly.....	4.0767929	11,934.19	39,154.1
		52 51 03.54	232 47 16.95	Starbuck.....	4.0819752	12,077.45	39,624.1
Higgins astronomical station, 1903.....	36 07 20.081	46 36 29.51	226 33 38.17	Starbuck.....	4.0007685	10,017.71	32,866.4
	100 01 24.081	131 05 41.82	311 04 31.00	Corn.....	3.6003645	3,984.41	13,072.2
		252 45 53.28	72 47 23.66	Santa.....	3.6034663	4,012.97	13,165.9
Kelln (Okla.), 1927.....	36 14 17.867	150 29 54.63	330 25 11.45	Follett.....	4.3834082	24,177.32	79,321.8
	99 59 48.576	193 41 06.69	13 43 04.27	Catesby south base.....	4.3201090	20,898.21	68,563.5
		257 48 57.74	77 50 33.61	Apple.....	3.6172772	4,142.64	13,591.3

One-hundredth meridian boundary arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Principal points—Continued								
Hartman (Okla.), 1927.....	36 19 24.543	37 55 11.29	217 50 57.33	Moreland.....	4.2419198	17,455.00	57,266.9	
	99 59 52.970	204 58 13.23	25 00 13.54	Catesby south base.....	4.0781456	11,971.42	39,276.2	
		334 08 02.61	154 09 41.19	Apple.....	3.9792426	9,533.28	31,277.1	
Ellis, 1927.....	36 27 31.375	73 31 10.68	253 26 35.31	Follett.....	4.0807017	12,042.09	39,508.1	
	100 00 02.973	170 29 44.39	350 28 49.37	Flat Top.....	4.1436267	13,919.60	45,667.9	
		247 24 24.34	67 28 05.54	Catesby north base.....	4.0013334	10,030.75	32,909.2	
		308 04 02.71	128 06 09.15	Catesby south base.....	3.8283825	6,735.70	22,098.7	
Kidder monument (1903) eccentric, 1927.....	36 29 59.452	47 03 34.38	227 03 15.87	Larkey.....	3.0247584	1,058.66	3,473.3	
	100 00 16.437	167 54 19.33	347 53 32.31	Flat Top.....	3.9718393	9,372.15	30,748.5	
		274 13 59.56	94 17 48.88	Catesby north base.....	3.9832788	9,622.30	31,569.2	
Supplementary points								
Kidder monument (1903) (Okla.), 1927.....	36 30 01.609	79 12 36.72	259 12 28.38	Kidder monument (1903) eccentric.....	2.5503189	355.074	1,164.94	
	100 00 02.422							
Texola, water tank (Okla.), 1927 ¹	35 13 09.58	5 32 16	185 31 13	Coon.....	4.455995	28,575.6	93,752	
	99 59 17.78	6 51 09	186 50 53	Breaks.....	3.754567	5,682.9	18,645	
Higgins, water tank, 1927.....	36 07 00.391	247 32 20.4	67 33 18.5	Mussetter.....	3.426869	2,672.2	8,767	
	100 01 29.010	48 44 52.3	228 42 03.9	Starbuck.....	3.978498	9,517.0	31,224	
		138 15 31.6	318 14 23.7	Corn.....	3.635809	4,323.2	14,184	
Shattuck, water tank (Okla.), 1927.....	36 15 56.842	50 21 56.3	230 15 37.1	Corn.....	4.318928	20,841.5	68,377	
	99 52 42.111	71 07 26.8	250 58 58.3	Moreland.....	4.356267	22,712.6	74,516	
		71 45 30.4	251 42 54.1	Apple.....	3.841847	6,947.8	22,795	
		74 02 47.9	253 58 35.7	Kelln.....	4.044367	11,075.6	36,337	
		120 48 28.1	300 44 13.0	Hartman.....	4.097353	12,512.8	41,052	
Follett, railroad water tank, 1927.....	36 25 39.574	268 36 39.9	83 37 01.8	Follett.....	2.962390	917.0	3,009	
	100 08 23.338	355 26 02.1	175 26 50.1	Moreland.....	4.405114	25,416.4	83,387	
		355 29 32.4	175 30 48.4	Starbuck.....	4.611724	40,900.1	134,186	
Old northeast corner of Texas, 1927 ¹	36 29 59.21	39 30 20	219 30 06	Larkey.....	2.9661591	925.0	3,035	
	100 00 23.93	169 01 57	349 01 14	Flat Top.....	3.9704493	9,342.2	30,650	

Thirty-fifth parallel arc

Principal points																	
Self (Okla.), 1921	35 07 58.773																
	99 48 50.692																
Vinson (Okla.), 1921	34 54 42.551	196 41 26.68	16 44 13.47	Self	4.4085580	25,618.75	84,050.8										
	99 53 41.317																
Branson, 1921	34 55 14.329	236 39 48.25	56 53 22.59	Self	4.6334151	42,994.71	141,058.5										
	100 12 29.493	271 52 07.42	92 02 53.17	Vinson	4.4571944	28,654.60	94,011.0										
Coon, 1921	34 57 46.607	74 54 19.80	254 47 48.60	Branson	4.2542225	17,956.53	58,912.4										
	100 01 06.473	224 36 34.02	44 43 36.55	Self	4.4236622	26,525.41	87,025.4										
		296 37 26.16	116 41 41.09	Vinson	4.1017782	12,640.91	41,472.7										
Trimmins, 1921	35 08 39.998	271 32 59.34	91 49 20.56	Self	4.6352512	43,176.87	141,656.1										
	100 17 15.503	309 16 19.47	129 25 36.03	Coon	4.5018307	31,756.36	104,187.3										
		343 41 56.03	163 44 40.21	Branson	4.4127038	25,864.48	84,857.0										
Bain, 1921	34 51 50.713	223 49 07.39	44 00 24.78	Trimmins	4.6352174	43,173.51	141,645.1										
	100 36 56.377	260 19 16.58	80 33 15.69	Branson	4.5771615	37,771.26	123,921.2										
Rowe, 1921	35 12 27.609	280 54 19.75	101 07 59.81	Trimmins	4.5646270	36,696.70	120,395.8										
	100 40 59.000	306 10 58.64	126 27 20.74	Branson	4.7304650	53,760.71	176,379.9										
		350 48 55.13	170 51 14.42	Bain	4.5866924	38,609.34	126,670.8										
Jerico, 1921	35 09 54.640	257 40 17.98	77 48 32.07	Rowe	4.3463540	22,200.05	72,834.7										
	100 55 16.436	320 03 02.01	140 13 33.21	Bain	4.6386451	43,515.61	142,767.5										
Brumley, 1921	34 53 48.644	182 28 33.21	2 29 02.40	Jerico	4.4741606	29,796.18	97,756.3										
	100 56 07.297	213 39 08.31	33 47 49.96	Rowe	4.6176215	41,459.26	136,020.9										
		276 59 46.16	97 10 44.33	Bain	4.4691284	29,452.93	96,630.2										
McDowell, 1921	35 00 08.943	236 07 49.38	56 18 01.46	Jerico	4.5113226	32,458.06	106,489.5										
	101 13 01.351	294 24 23.71	114 34 04.62	Brumley	4.4513820	28,273.66	92,761.2										
Lark, 1921	35 12 26.348	279 13 04.74	99 23 54.38	Jerico	4.4609664	28,904.56	94,831.0										
	101 14 03.829	321 31 55.71	141 42 13.99	Brumley	4.6428513	43,939.11	144,156.9										
		356 00 42.75	176 01 18.68	McDowell	4.3575402	22,779.29	74,735.1										
Wilson, 1921	35 03 30.800	225 52 53.74	45 59 21.33	Lark	4.3753061	23,730.46	77,855.7										
	101 25 17.347	288 22 49.92	108 29 52.39	McDowell	4.2937253	19,666.42	64,522.2										
Conway, 1921	35 12 24.263	269 41 41.49	89 47 03.64	Lark	4.1502624	14,133.91	46,371.0										
	101 23 22.600	325 10 35.33	145 16 32.59	McDowell	4.4407006	27,586.75	90,507.9										
		10 01 50.24	190 00 44.21	Wilson	4.2225677	16,694.28	54,771.1										

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
Principal points—Continued													
Washburn, 1921.....	35	10	58.632	260	51	28.35	80	57	44.12	Conway.....	4.2228081	16,703.52	54,801.5
	101	34	14.575	315	22	11.61	135	27	20.68	Wilson.....	4.2873081	19,377.96	63,575.9
Butterfield, 1921.....	35	02	39.190	193	41	12.12	13	42	37.33	Washburn.....	4.1998016	15,841.69	51,973.9
	101	36	42.720	228	16	02.97	48	23	43.33	Conway.....	4.4332902	27,120.03	88,976.3
				264	42	48.96	84	49	22.58	Wilson.....	4.2415903	17,441.76	57,223.5
Benton, 1921.....	35	11	31.783	272	50	38.55	92	58	16.67	Washburn.....	4.3040595	20,140.00	66,076.0
	101	47	29.585	315	00	20.60	135	06	32.72	Butterfield.....	4.3652603	23,187.84	76,075.4
Merry, 1921.....	35	02	44.776	197	17	53.58	17	19	48.60	Benton.....	4.2307401	17,011.40	55,811.6
	101	50	49.524	238	47	12.62	58	56	44.92	Washburn.....	4.4688620	29,434.86	96,570.9
				270	23	31.30	90	31	37.55	Butterfield.....	4.3316807	21,462.52	70,415.0
Bushland, 1921.....	35	10	35.902	265	52	19.50	86	01	33.25	Benton.....	4.3869679	24,376.31	79,974.6
	102	03	30.615	306	55	43.89	127	03	01.64	Merry.....	4.3825625	24,130.29	79,167.5
Umbarger, 1921.....	35	00	54.278	193	55	24.83	13	57	05.80	Bushland.....	4.2664040	18,467.33	60,588.2
	102	06	26.231	235	35	52.33	55	46	45.96	Benton.....	4.5422257	34,851.84	114,343.1
				261	45	51.97	81	54	49.65	Merry.....	4.3799852	23,987.51	78,699.0
Evert, 1921.....	35	13	29.416	282	24	37.12	102	33	47.35	Bushland.....	4.3932410	24,730.96	81,138.2
	102	19	25.141	319	39	17.78	139	46	45.88	Umbarger.....	4.4843647	30,504.56	100,080.4
Whitsett, 1921.....	35	03	45.974	194	54	58.40	14	56	47.43	Evert.....	4.2697016	18,608.08	61,050.0
	102	22	34.546	246	20	44.58	66	31	42.67	Bushland.....	4.4996974	31,600.75	103,676.8
				282	05	18.04	102	14	33.98	Umbarger.....	4.3997970	25,107.13	82,372.3
Vega north base, 1921.....	35	11	48.318	262	41	26.78	82	50	46.51	Evert.....	4.3935795	24,750.24	81,201.4
	102	35	35.891	306	51	30.09	126	58	59.70	Whitsett.....	4.3934773	24,744.42	81,182.3
Vega south base, 1921.....	35	05	14.132	196	07	37.63	16	08	57.55	Vega north base.....	4.1019483	12,645.858	41,488.95
	102	37	54.743	241	23	18.14	61	33	57.06	Evert.....	4.5046582	31,963.79	104,867.9
				276	34	23.72	96	43	12.51	Whitsett.....	4.3705349	23,471.18	77,005.0
Harwell, 1921.....	35	10	47.882	265	36	29.19	85	45	51.57	Vega north base.....	4.3937628	24,760.69	81,235.7
	102	51	51.796	295	49	18.87	115	57	20.58	Vega south base.....	4.3720967	23,555.74	77,282.5
Bippus, 1921.....	34	59	44.389	215	50	39.66	35	56	15.42	Harwell.....	4.4020620	25,238.41	82,803.0
	103	01	35.891	240	25	35.07	60	40	32.00	Vega north base.....	4.6568221	45,375.57	148,869.7
				254	07	57.42	74	21	33.41	Vega south base.....	4.5731699	37,425.70	122,787.5
Warmuth (N.Mex.), 1921.....	35	14	38.017	281	04	04.40	101	17	42.32	Harwell.....	4.5631550	36,572.53	119,988.4
	103	15	30.312	322	26	11.05	142	34	11.08	Bippus.....	4.5404565	34,710.15	113,878.2
Martin (N.Mex.), 1921.....	34	59	35.417	202	31	20.46	22	35	42.97	Warmuth.....	4.4788496	30,119.63	98,817.5
	103	23	06.632	246	16	36.82	66	34	34.51	Harwell.....	4.7144715	51,816.90	170,002.6
				269	24	47.71	89	37	07.95	Bippus.....	4.5150058	32,734.51	107,396.5
Canadian (N.Mex.), 1921.....	35	15	38.499	324	10	01.41	144	18	02.74	Bippus.....	4.5591430	36,236.23	118,885.0
	103	15	32.394	21	13	05.68	201	08	44.31	Martin.....	4.5028287	31,829.42	104,427.0
				283	53	00.94	104	06	40.23	Harwell.....	4.5685150	37,026.70	121,478.4
Glen Rio (Tex.-N.Mex.) 1921.....	35	10	04.675	58	19	05.70	238	07	15.63	Martin.....	4.5660752	36,819.27	120,797.9
	103	02	31.152	117	33	57.18	297	26	26.69	Canadian.....	4.3478550	22,276.91	73,086.8
Clark monument no. 9 (Tex.-N.Mex.), 1921.....	34	57	39.544	96	36	08.52	276	24	20.70	Martin.....	4.4986277	31,523.01	103,421.7
	103	02	31.878	149	19	55.56	329	12	26.64	Canadian.....	4.5874995	38,681.16	126,906.4
				180	02	44.98	0	02	45.40	Glen Rio.....	4.3610139	22,962.22	75,335.2
Supplementary points													
Wellington, water tank, 1921.....	34	51	32.428	168	01	56.0	347	59	23.9	Trimmins.....	4.510166	32,371.7	106,206
	100	12	50.327	184	25	19.9	4	25	31.9	Branson.....	3.836226	6,858.5	22,502
Shamrock, water tank, 1921.....	35	12	51.094	353	28	08.9	173	29	33.3	Branson.....	4.515577	32,777.6	107,538
	100	14	56.365	24	28	31.5	204	27	11.3	Trimmins.....	3.929483	8,501.3	27,891
Lark, water tank, 1921 ¹	35	12	25.43	261	20	05	81	20	10	Lark.....	2.271989	187.1	614
	101	14	11.14	355	32	29	175	33	09	McDowell.....	4.357264	22,764.8	74,688
Claude Methodist Episcopal Church, spire, 1921.....	35	06	25.035	45	54	42.5	225	52	36.8	Wilson.....	3.887318	7,714.7	25,311
	101	21	38.675	166	38	33.0	346	37	33.1	Conway.....	4.056084	11,378.5	37,331
Claude courthouse, 1921.....	35	06	33.195	45	39	04.1	225	36	53.7	Wilson.....	3.905162	8,038.3	26,372
	101	21	30.510	165	18	55.3	345	17	50.7	Conway.....	4.048620	11,184.6	36,695
Conway latitude and longitude station, 1920 ¹	35	12	26.37										
	101	22	55.55										
Amarillo, Great West Mill & Elevator, light, 1921.....	35	12	41.573	322	15	28.8	142	16	06.7	Benton.....	3.434508	2,719.6	8,923
	101	48	35.386	10	28	23.8	190	27	06.6	Merry.....	4.271894	18,702.3	61,359
Amarillo, water tank, 1921.....	35	12	40.491	298	48	19.9	118	49	47.5	Benton.....	3.642728	4,392.7	14,412
	101	50	01.730	3	46	30.3	183	46	02.8	Merry.....	4.264765	18,397.8	60,360
Amarillo, post office, 1921.....	35	12	24.191	291	51	01.6	111	52	33.2	Benton.....	3.637184	4,336.9	14,229
	101	50	08.697	3	18	59.8	183	18	36.3	Merry.....	4.252501	17,885.5	58,679

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
Canyon, West Texas State Normal School, 1921. ¹	34 58 53.34 101 54 52.97	102 01 27 220 51 21	281 54 49 40 53 40	Umbarger..... Merry.....	4.254571 3.974607	17,971.0 9,432.1	58,960 30,945	
Bushland, water tank, 1921 ¹	35 11 32.29 102 03 40.60	351 43 39 12 03 24	171 43 45 192 01 49	Bushland..... Umbarger.....	3.244549 4.303282	1,756.1 20,104.0	5,761 65,958	
Umbarger, elevator, 1921 ¹	34 57 08.68 102 06 27.40	180 14 39 190 11 38	0 14 40 10 13 20	Umbarger..... Bushland.....	3.842109 4.402702	6,952.0 25,275.6	22,808 82,925	
Wildorado, Lester Stone Co.'s elevator, center, 1921.	35 12 35.406 102 12 05.356	285 44 59.5 98 32 45.8	105 49 56.2 278 28 32.2	Bushland..... Evert.....	4.131393 4.051018	13,533.0 11,246.5	44,400 36,898	
Vega, Oldham County Courthouse, 1921 ¹	35 14 47.84 102 25 38.20	284 20 29 69 56 41	104 24 04 249 50 56	Evert..... Vega north base.....	3.988453 4.206724	9,737.6 16,096.2	31,947 52,809	
Oil derrick, 1921 ¹	35 10 34.81 102 58 39.78	110 09 19 267 43 58	289 59 35 87 47 53	Canadian..... Harwell.....	4.435624 4.014156	27,266.2 10,331.3	89,456 33,895	
Glenrio, water tank, 1921 ¹	35 10 42.99 103 02 27.68	114 42 43 269 24 44	294 35 10 89 30 51	Canadian..... Harwell.....	4.839162 4.206569	21,835.4 16,090.5	71,638 52,790	

Texas-Oklahoma boundary arc (parallel of 36°30')

<i>Principal points</i>							
Rabbit (N.Mex.), 1922.....	36 31 56.063 103 14 39.932						
Eklund (N.Mex.), 1931.....	36 31 24.371 103 10 12.930	98 23 36.85	278 20 57.92	Rabbit.....	3.8269843	6,714.05	22,027.7
Hoover (N.Mex.), 1922.....	36 35 40.959 103 03 53.428	50 04 00.30 66 43 46.27	230 00 14.25 346 07 21.13	Eklund..... Rabbit.....	4.0903783 4.2432188	12,313.41 17,507.08	40,398.2 57,437.8
Clay (N.Mex.), 1922.....	36 27 25.997 103 09 49.410	139 02 53.05 175 26 47.11 210 06 19.41	319 00 00.26 355 26 33.13 30 09 51.29	Rabbit..... Eklund..... Hoover.....	4.0424495 3.8675178 4.2465202	11,026.80 7,370.85 17,640.88	36,177.1 24,182.5 57,876.8
School (Okla.), 1931.....	36 36 22.829 102 56 57.383	49 18 58.14 82 55 12.84 49 58 00.1	229 11 18.57 282 51 04.78	Clay..... Hoover..... Azimuth mark (Clayton municipal water tank).	4.4039928 4.0179077	25,350.87 10,420.96	83,172.0 34,189.4
Worsham, 1931.....	36 26 59.251 103 00 20.038	93 22 28.80 161 44 49.40 196 10 01.84 358 23 18.3	273 16 50.50 341 42 42.41 16 12 02.47	Clay..... Hoover..... School..... Azimuth mark (R.M. no. 1)	4.1523615 4.2287799 4.2574020	14,202.39 16,934.79 18,088.48	46,595.7 55,560.2 59,345.3
Felt (Okla.), 1931.....	36 36 35.908 102 46 09.611	50 02 04.85 88 37 08.61 167 47 12.5	229 53 38.63 268 30 42.32	Worsham..... School..... Azimuth mark (R.M. no. 2)	4.4414157 4.2069261	27,632.22 16,103.71	90,656.7 52,833.6
X. I. T., 1931.....	36 27 51.452 102 47 30.402	85 15 51.55 138 13 31.34 187 04 47.23 0 16 38.2	265 08 14.21 318 07 53.81 7 05 35.33	Worsham..... School..... Felt..... Azimuth mark (R.M. no. 1)	4.2840233 4.3253409 4.2119278	19,231.95 21,151.49 16,290.25	63,096.8 69,394.5 53,445.6
Harmer (Okla.), 1931.....	36 36 44.824 102 36 17.916	45 33 06.69 88 58 41.70 131 59 03	225 26 26.32 268 52 48.83	X. I. T..... Felt..... Azimuth mark (grain elevator, south gable)	4.3702277 4.1675246	23,454.58 14,707.02	76,950.6 48,251.3
Schellenberg, 1931.....	36 29 00.224 102 36 59.784	82 21 44.23 135 48 41.54 184 09 19.71 260 12 37.7	262 15 29.36 315 43 14.14 4 09 44.64	X. I. T..... Felt..... Harmer..... Azimuth mark (R.M. no. 2)	4.1998082 4.2923380 4.1571138	15,841.93 19,603.70 14,358.66	51,974.7 64,316.5 47,108.4
Rogers (Okla.), 1931.....	36 36 26.164 102 24 54.560	52 45 05.16 91 59 46.95 308 21 48.6	232 37 53.32 271 52 59.42	Schellenberg..... Harmer..... Azimuth mark (Kerrick elevator, southwest gable).	4.3556161 4.2302546	22,678.59 16,992.39	74,404.7 55,749.2
Sneed, 1931.....	36 27 04.530 102 25 52.072	102 09 43.93 139 00 54.05 184 43 11.53 260 36 09.9	282 03 07.06 318 54 41.50 4 43 45.76	Schellenberg..... Harmer..... Rogers..... Azimuth mark (tip of windmill)	4.2305137 4.3749862 4.2398198	17,002.54 23,713.64 17,370.80	55,782.5 77,800.5 56,990.7
Mooney (Okla.), 1931.....	36 35 03.867 102 13 34.570	51 13 14.74 98 35 30.67 6 43 32.4	231 05 55.87 278 28 45.28	Sneed..... Rogers..... Azimuth mark (elevator, southeast gable)	4.3721560 4.2327762	23,558.95 17,091.34	77,293.0 56,073.8
Kerrick, 1931.....	36 27 00.228 102 14 37.180	90 30 27.64 138 41 18.15 185 57 38.06 184 26 30.2	270 23 46.67 318 35 10.67 5 58 15.32	Sneed..... Rogers..... Mooney..... Azimuth mark (Kerrick elevator, northwest gable).	4.2254958 4.3662798 4.1757665	16,807.22 23,242.34 14,988.79	55,141.7 76,254.2 49,175.7

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Griggs (Okla.), 1931.....	36 35 43.630 102 03 37.118	45 33 46.88 85 19 54.16 1 56 21.7	225 27 14.05 265 13 58.03	Kerrick..... Mooney..... Azimuth mark (Stratford, West Texas Utilities Co. water tank, final).	4.3621253 4.1732463	23,021.06 14,902.06	75,528.3 48,891.2
O'Brien, 1931.....	36 27 22.092 102 03 42.665	87 41 10.83 134 04 23.76 180 30 39.63 258 03 28.2	267 34 41.94 313 58 31.51 0 30 42.93	Kerrick..... Mooney..... Griggs..... Azimuth mark (Texhoma, Cimarron Utilities Co. water tank, final).	4.2125248 4.3113553 4.1892088	16,312.66 20,481.19 15,459.98	53,519.1 67,195.4 50,721.6
Mouse (Okla.), 1931.....	36 36 10.123 101 52 44.840	45 12 39.13 87 10 13.96 324 46 28	225 06 07.57 267 03 45.06	O'Brien..... Griggs..... Azimuth mark (Texhoma, Riffe's grain elevator).	4.3632506 4.2104010	23,080.79 16,233.08	75,724.2 53,258.0
Elliot, 1931.....	36 27 30.613 101 54 03.415	89 00 16.82 136 50 35.37 186 57 11.10 47 59 15.8	268 54 32.62 316 44 53.90 6 57 57.88	O'Brien..... Griggs..... Mouse..... Azimuth mark (Stratford, West Texas Utilities Co. water tank, final).	4.1591489 4.3190714 4.2076935	14,426.10 20,848.34 16,132.20	47,329.6 68,399.9 52,927.1
Whorton (Okla.), 1931.....	36 36 00.144 101 43 46.032	44 24 42.29 91 21 38.28 274 51 32.8	224 18 34.80 271 16 17.02	Elliot..... Mouse..... Azimuth mark (Goodwell municipal water tank).	4.3417794 4.1269542	21,967.44 13,395.35	72,071.5 43,947.9
Hardy, 1931.....	36 27 24.121 101 48 29.107	91 24 17.00 158 35 47.63 203 51 28.98 203 55 16.9	271 20 58.34 338 33 15.41 23 54 17.47	Elliot..... Mouse..... Whorton..... Azimuth mark (Texhoma, Cimarron Utilities Co. water tank).	3.9204820 4.2409728 4.2404265	8,326.88 17,416.98 17,395.08	27,319.1 57,142.2 57,070.4
Camp (Okla.), 1931.....	36 36 13.188 101 36 00.678	48 50 51.05 88 02 30.74 70 54 44.5	228 43 25.55 267 58 13.27	Hardy..... Whorton..... Azimuth mark (Goodwell municipal water tank).	4.3965926 4.0634485	24,750.99 11,573.07	81,203.9 37,969.3
Graham, 1931.....	36 27 33.823 101 35 20.198	89 11 34.72 141 09 44.04 176 24 14.23 89 50 52.3	269 03 45.93 321 04 42.96 356 23 50.14	Hardy..... Whorton..... Camp..... Azimuth mark (R.M. no. 2)	4.2982840 4.3020726 4.2052182	19,646.45 20,048.07 16,040.51	64,456.7 65,774.4 52,626.2
Bridgeman (Okla.), 1931.....	36 36 19.901 101 25 13.167	43 00 40.47 89 19 00.83 86 08 51.1	222 54 39.12 269 12 34.73	Graham..... Camp..... Azimuth mark (Goodwell municipal water tank).	4.3455357 4.2066706	22,158.26 16,094.24	72,697.6 52,802.5
Chipperfield, 1931.....	36 27 32.312 101 24 07.026	90 12 53.15 132 11 01.19 174 13 41.21 125 31 29.6	270 06 13.12 312 03 56.39 354 13 01.84	Graham..... Camp..... Bridgeman..... Azimuth mark (Goodwell municipal water tank).	4.2243283 4.3790638 4.2133958	16,762.10 23,936.67 16,345.41	54,993.7 78,532.2 53,626.6
Wall (Okla.), 1931.....	36 36 00.236 101 15 17.426	40 07 31.18 92 23 37.09 254 58 38	220 02 15.94 272 17 41.87	Chipperfield..... Bridgeman..... Azimuth mark (Hardesty grain elevator, north gable).	4.3109521 4.1708184	20,462.19 14,818.98	67,133.0 48,618.6
Browder, 1931.....	36 28 00.879 101 16 30.881	85 36 16.04 139 51 26.94 187 02 37.55 136 10 19.4	265 31 44.95 319 46 16.01 7 03 21.28	Chipperfield..... Bridgeman..... Wall..... Azimuth mark (Hitchland railroad water tank).	4.0565835 4.3039394 4.1728436	11,391.57 20,134.43 14,888.25	37,373.8 66,057.7 48,845.9
Barnes (Okla.), 1931.....	36 36 06.151 101 05 52.175	46 46 49.98 89 18 11.80 99 16 55	226 40 29.75 269 12 34.78	Browder..... Wall..... Azimuth mark (Hardesty grain elevator, southwest corner).	4.3388877 4.1476861	21,821.66 14,050.32	71,593.2 46,096.8
Hogland, 1931.....	36 27 09.412 101 01 39.381	94 09 40.50 128 51 56.00 159 12 26.63 286 08 26.9	274 00 50.72 308 43 49.11 339 09 56.17	Browder..... Wall..... Barnes..... Azimuth mark (Perryton municipal water tank).	4.3474243 4.4168643 4.2479593	22,254.83 26,113.45 17,699.43	73,014.4 85,673.9 58,068.9
Mitchusson (Okla.), 1931.....	36 36 10.272 100 49 40.766	47 03 33.43 89 46 44.43 92 16 21	226 56 25.70 269 37 05.23	Hogland..... Barnes..... Azimuth mark (Hardesty grain elevator, southwest corner).	4.3881879 4.3828088	24,444.88 24,143.98	80,199.6 79,212.4
Campbell, 1931.....	36 28 10.791 100 54 28.792	80 01 40.97 130 48 56.14 205 50 21.30 309 40 58.6	259 57 25.08 310 42 09.31 25 53 12.77	Hogland..... Barnes..... Mitchusson..... Azimuth mark (Perryton municipal water tank).	4.0369116 4.3510773 4.2154948	10,887.09 22,442.81 16,424.60	35,718.7 73,631.1 53,886.4
Shadwick (Okla.), 1931.....	36 36 20.899 100 43 49.138	46 32 17.67 87 52 57.11 16 16 08.3	226 25 56.84 267 49 27.43	Campbell..... Mitchusson..... Azimuth mark (Perryton municipal water tank).	4.3412506 3.9417778	21,940.71 8,745.36	71,983.8 28,692.1

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Morris, 1931	36 28 21.883	88 56 39.09	268 49 39.35	Campbell	4.2450992	17,583.25	57,687.7
	100 42 42.664	144 16 01.78	324 11 52.86	Mitchusson	4.2502623	17,793.54	58,377.6
		173 36 56.78	353 36 17.21	Shadwick	4.1719453	14,857.48	48,744.9
		45 56 30.1		Azimuth mark (Perryton municipal water tank).			
Pruett (Okla.), 1931	36 36 06.490	49 10 19.27	229 03 43.34	Morris	4.3400539	21,880.33	71,785.7
	100 31 37.638	91 27 36.09	271 20 19.91	Shadwick	4.2597358	18,185.94	59,665.0
		3 43 17.1		Azimuth mark (Booker municipal water tank).			
Booker, 1931	36 27 45.583	94 02 52.58	273 56 30.08	Morris	4.2057683	16,060.84	52,692.9
	100 31 59.149	132 01 31.16	311 54 28.49	Shadwick	4.3757321	23,753.74	77,932.1
		181 58 59.50	1 59 12.30	Pruett	4.1889063	15,449.21	50,686.3
		74 11 18.3		Azimuth mark (Perryton municipal water tank).			
Carbin (Okla.), 1931	36 35 52.174	273 21 31.65	93 32 50.57	Flat Top	4.4527691	28,364.10	93,057.9
	100 20 34.394	314 33 54.76	134 41 31.64	Follett	4.4289010	26,847.32	88,081.6
		48 41 37.63	228 34 50.03	Booker	4.3559652	22,696.83	74,464.5
		91 35 17.97	271 28 42.52	Pruett	4.2172433	16,490.86	54,103.8
		47 31 44.7		Azimuth mark (Booker municipal water tank).			
Kirschman, 1931	36 26 45.351	100 37 22.41	280 33 25.47	Booker	4.0044132	10,102.13	33,143.4
	100 25 20.377	151 32 40.27	331 28 55.74	Pruett	4.2940049	19,679.09	64,563.8
		202 51 46.53	22 54 36.73	Carbin	4.2623442	18,295.50	60,024.5
		274 16 54.59	94 27 20.51	Follett	4.4203638	26,324.72	86,367.0
		94 02 02.5		Azimuth mark (Booker municipal water tank).			
Ivanhoe (Okla.), 1931	36 33 02.629	67 32 44.77	247 21 35.35	Kirschman	4.4818419	30,327.87	99,500.7
	100 06 34.925	104 07 36.34	283 59 16.13	Carbin	4.3327662	21,516.23	70,591.2
		244 41 29.28	64 44 27.71	Flat Top	3.9157298	8,236.25	27,021.8
		306 21 13.86	126 24 40.58	Larkey	4.0307807	10,734.47	35,218.0
		7 27 13.89	187 26 31.31	Follett	4.1383154	13,750.40	45,112.8
		10 55 45.9		Azimuth mark (Follett municipal water tank).			
Supplementary points							
Eccentric No. 4 (N.Mex.-Tex.), 1922	36 26 38.574	97 36 35.18	277 32 12.88	Clay	4.0449689	11,091.0	36,388
	103 02 27.925	118 18 08.64	298 10 53.34	Rabbit	4.3155996	20,682.3	67,855
		172 45 18.90	352 44 28.02	Hoover	4.2266824	16,853.2	55,293
Mile Corner No. 306 (N.Mex.-Tex.), 1922 ¹	36 26 21.60	180 07 44	0 07 44	Eccentric No. 4	2.718672	523.205	1,716.55
	103 02 27.98						
Milepost No. 4 (N.Mex.-Tex.), 1922 ¹	36 26 32.78	180 04 57	0 04 57	Eccentric No. 4	2.251480	178.435	585.42
	103 02 27.94						
Northwest corner of Texas, Clarks monument (N.Mex.-Tex.), 1922	36 30 01.598	66 26 35.3	246 22 13.0	Clay	4.0785754	11,983.3	39,315
	103 02 28.272	101 01 50.3	280 54 34.9	Rabbit	4.2682006	18,543.9	60,839
Milepost No. 1 (N.Mex.-Tex.), 1922	36 30 01.606	69 45 52.5	249 40 42.5	Clay	4.1411113	13,839.2	45,404
	103 01 07.937	99 58 26.2	279 50 23.0	Rabbit	4.3119598	20,509.7	67,289
Texhomex (Tex.-Okla.-N.Mex.), 1931	36 30 01.582	3 20 53.78	183 20 45.93	Worsham	3.7504860	5,629.71	18,470.1
	103 00 06.835	71 45 00.15	251 39 13.80	Clay	4.1839776	15,274.87	50,114.3
		99 39 13.55	279 33 12.94	Eklund	4.1845773	15,295.98	50,183.6
		151 42 19.16	331 40 04.23	Hoover	4.0749076	11,882.49	38,984.5
		70 02 01.7		Azimuth mark (Clayton municipal water tank).			
Kidder astronomical station (Tex.-Okla.-N.Mex.), 1931	36 30 03.679	288 49 17.5	108 49 22.0	Texhomex	2.3017871	200.349	657.31
	103 00 14.455						
Clayton, municipal water tank (silver), final (N.Mex.), 1931	36 26 48.814	150 12 03.0	330 09 53.3	Rabbit	4.038078	10,916.4	35,815
	103 11 01.857	188 09 20.4	8 09 49.5	Eklund	3.933516	8,580.6	28,152
		212 58 57.7	33 03 12.7	Hoover	4.291415	19,562.1	64,180
		229 49 37.5	49 58 00.1	School	4.438813	27,467.1	90,115
		237 33 59.3	57 34 42.4	Clay	3.329883	2,137.4	7,012
		249 55 32.2	70 02 01.7	Texhomex	4.239446	17,355.9	56,942
		268 47 38.0	88 53 59.3	Worsham	4.203762	15,986.8	52,450
Texline, West Texas Utilities Co., water tank, final, 1931	36 22 30.990	125 46 04.0	305 41 02.8	Clay	4.192364	15,572.7	51,091
	103 01 21.972	131 18 09.9	311 10 15.8	Rabbit	4.422000	26,424.1	86,693
		141 14 07.2	321 08 51.8	Eklund	4.324243	21,098.1	69,219
		171 12 40.9	351 11 10.9	Hoover	4.391637	24,639.8	80,839
		190 33 57.0	10 34 33.8	Worsham	3.924870	8,411.4	27,596
		194 22 58.6	14 25 36.1	School	4.422796	26,472.6	86,852
Booster station, black water tank, final (N.Mex.), 1931	36 30 42.209	319 11 55.4	139 14 17.0	Worsham	3.957894	9,076.0	29,777
	103 04 18.185	53 45 56.1	233 42 39.2	Clay	4.009674	10,225.3	33,548
		98 25 31.1	278 19 21.2	Rabbit	4.194120	15,635.8	51,296
Booster station, galvanized tank on red platform, center (N.Mex.), 1931. ¹	36 30 45.93	54 12 15	234 08 51	Clay	4.022390	10,529.1	34,544
	103 04 06.44	97 51 52	277 45 35	Rabbit	4.201638	15,908.8	52,194

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
T. 1 N., R. 4 E., sec. 36, southeast corner (Tex.-Okla.), 1931.	36 30 05.538 102 34 14.587	229 50 36.41 293 59 42.10 63 55 32.07	49 56 09.95 114 04 40.84 243 53 53.82	Rogers..... Sneed..... Schellenberg.....	4.2603270 4.1366472 3.6606837	18,210.72 13,697.68 4,578.08	59,746.3 44,939.8 15,019.9
Grain elevator, south gable (Okla.), 1931 ¹	36 38 50.65 102 39 11.47	281 44 37 311 57 20	101 53 08 131 59 03	Rogers..... Harmer.....	4.337495 3.763398	21,751.8 5,799.6	71,364 19,028
Rabbit Ear Butte, northernmost peak, tip (N.Mex.), 1931. ¹	36 31 44.38 103 10 09.42	273 04 26 275 40 13	93 25 48 95 59 57	T. 1 N., R. 4 E., sec. 36, southeast corner..... Schellenberg.....	4.730012 4.696980	53,704.7 49,771.4	176,196 163,292
Boise City, Cimarron Utilities Co., tank (Okla.), 1931.	36 43 44.773 102 30 50.006	301 53 35.9 326 49 51.8 32 11 55.1	122 03 54.1 146 53 24.1 212 08 39.3	Mooney..... Rogers..... Harmer.....	4.481699 4.208073 4.184490	30,317.9 16,146.3 15,292.9	99,468 52,973 50,173
Clark monument no. 5 (Tex.-Okla.), 1931.....	36 30 01.188 102 16 50.730	329 11 29.32 68 02 36.49 207 35 30.88	149 12 48.71 247 57 14.67 27 37 27.68	Kerrick..... Sneed..... Mooney.....	3.8124801 4.1624177 4.0223707	6,493.52 14,535.09 10,528.60	21,304.2 47,687.2 34,542.6
Clark monument no. 7 (Tex.-Okla.), 1931.....	36 30 00.277 101 56 02.099	327 21 10.96 66 59 58.51 133 07 09.12	147 22 21.52 246 55 24.69 313 02 38.15	Elliot..... O'Brien..... Griggs.....	3.7386372 4.0954844 4.1901850	5,478.19 12,459.03 15,494.76	17,973.0 40,876.0 50,835.7
Stratford, West Texas Utilities Co., water tank, final, 1931.	36 20 03.347 102 04 16.468	153 27 03.8 181 55 58.2 183 33 41.6 227 53 12.0 240 00 10.3	333 21 32.2 1 56 21.7 3 34 01.7 47 59 15.8 60 09 32.5	Mooney..... Griggs..... O'Brien..... Elliot..... Hardy.....	4.491945 4.462389 4.131931 4.313404 4.435187	31,041.7 28,999.4 13,549.7 20,578.0 27,238.7	101,843 96,142 44,454 67,513 89,366
Texhoma, Riffe's grain elevator, 1931 ¹	36 29 59.27 101 47 20.62	144 49 41 205 36 52	324 46 28 25 38 59	Mouse..... Whorton.....	4.145784 4.091231	13,988.9 12,337.6	45,895 40,478
Texhoma, Cimarron Utilities Co., water tank, final (Okla.), 1931.	36 30 12.732 101 46 56.463	278 08 25.0 285 43 23.8 23 56 12.0 64 51 12.5 78 13 26.5 141 50 38.5 203 50 33.5	98 21 59.2 105 50 17.7 203 55 16.9 244 46 58.6 258 03 28.2 321 47 11.0 23 52 26.9	Chipperfield..... Graham..... Hardy..... Elliot..... O'Brien..... Mouse..... Whorton.....	4.537141 4.255536 3.754803 4.069828 4.408141 4.146598 4.068525	34,446.2 18,010.9 5,885.9 11,744.3 25,594.2 14,015.2 11,709.1	113,012 59,091 18,654 38,531 83,970 45,982 38,416
Goodwell, municipal water tank (Okla.), 1931.....	36 35 36.997 101 38 10.305	45 25 52.2 94 54 53.0 250 53 27.3 266 01 07.9 305 23 07.8	225 19 43.9 274 51 32.8 70 54 44.5 86 08 51.1 125 31 29.6	Hardy..... Whorton..... Camp..... Bridgeman..... Chipperfield.....	4.335038 3.923000 3.532699 4.286929 4.410869	21,629.1 8,375.3 3,409.6 19,361.1 25,755.4	70,961 27,478 11,186 63,521 84,499
Hitchland south, 1931.....	36 23 44.997 101 21 25.882	150 12 17.15 222 56 58.38	330 10 41.46 42 59 53.57	Chipperfield..... Browder.....	3.9071438 4.0326086	8,075.02 10,779.75	26,492.8 35,366.6
Hitchland north, 1931.....	36 29 55.780 101 18 57.416	314 08 37.70 17 56 21.85 60 10 47.54	134 10 04.83 197 54 53.65 240 07 43.47	Browder..... Hitchland south..... Chipperfield.....	3.7062183 4.0796170 3.9487022	5,084.15 12,012.05 8,885.92	16,680.2 39,409.5 29,153.2
Guymon, black municipal standpipe, center (Okla.), 1931.	36 40 53.656 101 28 39.690	294 20 34.4 324 26 00.8 328 41 04.6 344 37 45.3 51 45 23.8	114 28 33.3 144 31 47.9 148 43 07.9 164 40 27.8 231 41 00.7	Wall..... Hitchland north..... Bridgeman..... Chipperfield..... Camp.....	4.340166 4.396449 3.994558 4.408482 4.144735	21,886.0 24,914.3 9,875.5 25,614.3 13,955.2	71,804 81,740 32,400 84,036 45,785
Hitch, 1931.....	36 29 58.326 101 25 15.018	339 23 03.66 125 47 27.77 180 13 27.06	159 23 44.08 305 41 03.25 0 13 28.16	Chipperfield..... Camp..... Bridgeman.....	3.6820036 4.2962923 4.0704735	4,808.43 19,783.00 11,761.79	15,775.7 64,904.7 38,588.5
Clark monument no. 9 (Tex.-Okla.), 1931.....	36 29 58.203 101 24 53.198	90 25 49.6	270 25 36.6	Hitch.....	2.7348454	543.057	1,781.68
Hitchland, R.R. water tank, final (Tex.-Okla.), 1931.	36 29 59.209 101 18 51.588	316 08 56.7 53 55 27.7 60 03 26.8	136 10 19.4 233 55 23.3 240 00 18.3	Browder..... Hitchland north..... Chipperfield.....	3.703874 2.253928 3.957335	5,056.8 179.4 9,064.3	16,591 589 29,738
Hansford County, Tex., northeast corner, 1931.	36 29 59.561 101 05 06.027	174 04 45.97 315 40 28.76	354 04 17.89 135 42 31.01	Barnes..... Hogland.....	4.0553969 3.8650476	11,360.49 7,329.05	37,271.9 24,045.4
Clark monument no. 10 (Tex.-Okla.), 1931.....	36 29 59.559 101 05 17.403	175 37 35.05 269 59 20.49 313 59 58.17	355 37 14.34 89 59 27.85 134 02 07.78	Barnes..... Hansford County, Tex., northeast corner..... Hogland.....	4.0543411 2.4885368 3.8777993	11,332.90 307.990 7,547.43	37,181.4 1,010.46 24,761.9
Hardesty, grain elevator, southwest corner (Okla.), 1931. ¹	36 36 50.05 101 11 26.37	272 03 22 279 13 36	92 16 21 99 16 55	Mitchusson..... Barnes.....	4.511486 3.925054	32,470.3 8,415.0	106,530 27,608
Hardesty, grain elevator, north gable (Okla.), 1931. ¹	36 36 50.07 101 11 26.81	75 00 55 87 28 33	254 58 38 267 20 20	Wall..... Bridgeman.....	3.773314 4.312969	5,933.5 20,557.4	19,467 67,445
Dower (Tex.-Okla.), 1931.....	36 30 01.611 100 48 12.074	70 00 56.36 169 01 19.41 209 11 52.01 290 31 26.70	249 57 12.35 349 00 26.59 29 14 28.61 110 34 42.57	Campbell..... Mitchusson..... Shadwick..... Morris.....	3.9991305 4.0635480 4.1269655 3.9423415	9,980.00 11,575.72 13,395.70 8,756.72	32,742.7 37,978.0 43,949.1 28,729.3

¹ No check on this position.

Texas-Oklahoma boundary arc (parallel of 36°30')—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Perryton, black water tank, 1931 ¹ -----	36 24 00.08	106 08 28	286 00 25	Hogland-----	4.323802	21,077	69,150
	100 48 06.37	195 38 20	15 40 53	Shadwick-----	4.375024	23,715	77,805
Perryton, municipal water tank (silver), final, 1931.	36 24 00.762	106 16 23.7	286 08 26.9	Hogland-----	4.318761	20,833.4	68,351
	100 48 16.286	129 44 39.9	309 40 58.6	Campbell-----	4.081403	12,061.5	39,572
		174 39 55.7	354 39 05.5	Mitchusson-----	4.353807	22,584.3	74,095
		180 32 24.2	0 32 26.7	Dower-----	4.046227	11,123.1	36,493
		196 13 29.3	16 16 08.3	Shadwick-----	4.375897	23,762.8	77,962
		225 53 11.9	45 56 30.1	Morris-----	4.063277	11,568.5	37,954
		254 01 37.9	74 11 18.3	Booker-----	4.403236	25,306.7	83,027
Gaylord (Tex.-Okla.), 1931-----	36 30 00.525	351 41 46.40	171 42 07.36	Kirschman-----	3.7838806	6,079.68	19,946.4
	100 25 55.634	65 20 37.87	245 17 01.74	Booker-----	3.9982226	9,959.16	32,674.3
		143 00 38.70	322 57 15.02	Fruett-----	4.1500806	14,128.00	46,351.6
		216 22 03.19	36 25 14.50	Carbin-----	4.1292269	13,465.64	44,178.5
Booker, municipal water tank (black), final, 1931.	36 27 09.104	98 17 47.4	278 11 37.0	Morris-----	4.194320	15,643.0	51,322
	100 32 20.901	183 42 51.3	3 43 17.1	Fruett-----	4.220089	16,599.3	54,460
		205 43 03.9	25 43 15.9	Booker-----	3.096225	1,248.0	4,094
		227 24 45.1	47 31 44.7	Carbin-----	4.377521	23,851.8	78,254
		241 07 03.4	61 10 51.5	Gaylord-----	4.039421	10,950.2	35,926
		273 57 53.6	94 02 02.5	Kirschman-----	4.021104	10,497.9	34,442
Follett, municipal water tank (black), final, 1931.	36 25 41.940	94 28 58.4	274 18 52.5	Kirschman-----	4.406271	25,484.2	83,609
	100 08 20.223	135 53 50.3	315 46 33.4	Carbin-----	4.418648	26,220.9	86,026
		190 54 43.3	10 55 45.9	Ivanhoe-----	4.140953	13,834.2	45,388
		210 27 59.8	30 32 00.6	Flat Top-----	4.297710	19,847.7	65,117
		273 27 34.3	93 27 54.3	Follett-----	2.924633	840.7	2,758
Northeast corner of Texas (1928), 1931-----	36 29 59.560	58 32 32.47	238 32 04.18	Larkey-----	3.1424295	1,388.13	4,554.2
	100 00 00.000	119 54 08.72	299 50 13.67	Ivanhoe-----	4.0542472	11,330.45	37,173.3
		165 28 53.17	345 27 56.36	Flat Top-----	3.9760355	9,463.15	31,047.0

TRIANGULATION IN TEXAS

¹ No check on this position.

Amarillo-Del Rio arc—Continued

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U. S. COAST AND GEODETIC SURVEY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Rogers, 1932.....	34 05 23.036	128 19 48.89	308 12 56.45	Watson.....	4.3796351	23,968.18	78,635.6
	101 40 41.338	179 27 52.36	359 27 49.06	Heath.....	4.2065077	16,088.21	52,782.7
		175 12 21.8		Azimuth mark (R.M. no. 2).....			
Teston, 1932.....	34 04 46.136	177 22 55.57	357 22 39.54	Watson.....	4.2041142	15,999.79	52,492.6
	101 52 27.359	226 06 09.87	46 12 42.98	Heath.....	4.3956119	24,866.34	81,582.3
		266 21 03.22	86 27 38.89	Rogers.....	4.2585491	18,136.32	59,502.2
		272 50 52.5		Azimuth mark (R.M. no. 1).....			
Stewart, 1932.....	33 55 29.380	136 14 21.56	316 08 22.95	Teston.....	4.3760517	23,771.23	77,989.4
	101 41 46.100	185 11 10.84	5 11 47.06	Rogers.....	4.2640244	18,366.42	60,257.2
		1 21 25.7		Azimuth mark (R.M. no. 1).....			
Holmes, 1932.....	33 55 43.205	178 48 24.04	358 48 16.44	Teston.....	4.2235432	16,731.82	54,894.3
	101 52 13.769	224 47 23.88	44 53 51.18	Rogers.....	4.4013396	25,196.47	82,665.4
		271 27 53.28	91 33 43.61	Stewart.....	4.2075618	16,127.30	52,911.0
		0 35 09.9		Azimuth mark (R.M. no. 2).....			
Linccum, 1932.....	33 46 55.891	134 48 51.64	314 42 56.65	Holmes.....	4.3630662	23,070.99	75,692.1
	101 41 36.558	179 06 44.60	359 06 39.29	Stewart.....	4.1992773	15,822.58	51,911.2
		173 43 06.2		Azimuth mark (R.M. no. 2).....			
Foster, 1932.....	33 47 24.792	188 23 37.87	8 24 27.02	Holmes.....	4.1909687	15,522.75	50,927.6
	101 53 41.992	230 53 30.24	51 00 09.09	Stewart.....	4.3747003	23,697.38	77,747.2
		272 40 31.75	92 47 15.16	Linccum.....	4.2714830	18,684.56	61,300.9
		175 13 30.3		Azimuth mark (R.M. no. 1).....			
Holt, 1932.....	33 39 02.240	129 14 38.56	309 07 49.04	Foster.....	4.3892460	24,504.51	80,395.2
	101 41 24.304	178 45 44.36	358 45 37.56	Linccum.....	4.1642432	14,596.31	47,888.1
		82 33 03.3		Azimuth mark (R.M. no. 2).....			
McCauley, 1932.....	33 38 03.987	174 50 50.38	354 50 16.76	Foster.....	4.2392570	17,348.30	56,916.9
	101 52 41.429	226 12 07.27	46 18 16.26	Linccum.....	4.3747415	23,099.63	77,754.5
		264 04 31.80	84 10 46.98	Holt.....	4.2440684	17,541.57	57,551.0
		8 49 50.2		Azimuth mark (R.M. no. 1).....			

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B.M. J 71 eccentric, 1932.....	33 28 28.890	136 18 17.54	316 12 14.17	McCauley.....	4.3896247	24,525.89	80,465.4
	101 41 44.021	181 29 29.53	1 29 40.43	Holt.....	4.2904643	19,519.30	64,039.6
		123 24 51.4		Azimuth mark (R.M. no. 2).....			
Shepard, 1932.....	33 28 33.462	186 19 07.72	6 19 49.47	McCauley.....	4.2475085	17,684.73	58,020.7
	101 53 56.951	225 00 13.52	45 07 09.63	Holt.....	4.4381523	27,425.36	89,978.0
		270 22 12.91	90 28 57.18	B. M. J 71 eccentric.....	4.2770257	18,924.56	62,068.3
Hillen, 1932.....	33 20 11.427	129 43 12.15	309 36 34.72	Azimuth mark (R.M. no. 1).....			
	101 41 55.095	181 04 07.67	1 04 13.77	Shepard.....	4.3843733	24,231.11	79,498.2
		84 17 12.2		B. M. J 71 eccentric.....	4.1854985	15,328.46	50,290.1
Thomas, 1932.....	33 19 41.488	176 41 49.19	356 41 29.03	Azimuth mark (R.M. no. 2).....			
	101 53 20.318	227 51 52.66	47 58 15.98	Shepard.....	4.2152751	16,416.29	53,859.1
		268 58 05.84	87 04 22.37	B. M. J 71 eccentric.....	4.3846018	24,243.86	79,540.1
Bartley, 1932.....	33 12 08.318	125 33 42.87	305 26 48.14	Hillen.....	4.2490821	17,745.25	58,219.2
	101 40 44.216	172 58 44.44	352 58 05.56	Azimuth mark (R.M. no. 2).....			
		92 16 22.2		Thomas.....	4.3809129	24,038.81	78,867.3
Crosby, 1932.....	33 11 13.965	181 34 01.96	1 34 11.03	Hillen.....	4.1759715	14,995.87	49,198.9
	101 53 36.858	227 35 41.11	47 42 06.01	Azimuth mark (R.M. no. 1).....			
		265 09 31.31	85 16 34.32	Thomas.....	4.1942700	15,641.20	51,316.2
Pennington, 1932.....	33 04 14.291	124 52 04.81	304 45 32.82	Hillen.....	4.3905450	24,577.91	80,636.0
	101 41 39.608	185 36 39.38	5 37 09.66	Bartley.....	4.3028366	20,083.37	65,890.2
		341 41 56.3		Azimuth mark (R.M. no. 1).....			
Pearce, 1932.....	33 01 56.744	169 18 51.64	349 17 43.33	Crosby.....	4.3549881	22,645.82	74,297.2
	101 51 31.816	221 39 22.03	41 45 15.84	Bartley.....	4.1665350	14,673.54	48,141.4
		254 32 14.41	74 37 37.39	Azimuth mark (R.M. no. 1).....			
Huff, 1932.....	32 55 10.114	126 26 44.12	306 20 47.93	Crosby.....	4.2422789	17,469.44	57,314.3
	101 40 37.406	174 30 08.83	354 29 34.95	Pennington.....	4.4020152	25,235.69	82,794.1
		77 00 10.5		Azimuth mark (R.M. no. 1).....	4.2024401	15,938.23	52,290.7
Akins, 1932.....	32 54 19.374	185 45 06.38	5 45 36.14	Pearce.....	4.3245086	21,110.99	69,261.6
	101 52 26.505	222 27 16.84	42 33 09.04	Pennington.....	4.2263780	16,841.39	55,253.8
		265 05 51.80	85 12 17.09	Azimuth mark (R.M. no. 1).....			
Southard, 1932.....	32 44 30.213	144 47 41.02	324 43 13.80	Huff.....	4.1510942	14,161.01	46,459.9
	101 44 13.533	195 54 00.88	15 55 58.05	Pennington.....	4.3954823	24,858.92	81,558.0
		254 21 59.7		Azimuth mark (O'Donnell municipal water tank).....	4.2669934	18,492.40	60,670.5
				Akins.....	4.3467821	22,221.95	72,906.5
				Huff.....	4.3117117	20,498.01	67,250.6
				Azimuth mark (R.M. no. 1).....			

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Lamesa, 1932.....	32 45 43.383	178 50 11.89	358 50 05.15	Akins.....	4.2013530	15,898.38	52,159.9
	101 52 14.084	226 00 36.47	46 06 54.28	Huff.....	4.4007194	25,160.51	82,547.4
		280 10 39.57	100 14 59.55	Southard.....	4.1041883	12,711.25	41,703.5
		355 21 49.4		Azimuth mark (R.M. no. 1).....			
Wasson, 1932.....	32 37 55.233	138 33 18.56	318 28 54.14	Lamesa.....	4.2844173	19,249.40	63,154.1
	101 44 04.591	178 54 13.81	358 54 08.98	Southard.....	4.0852661	12,169.31	39,925.5
		248 03 21.9		Azimuth mark (R.M. no. 1).....			
King, 1932.....	32 38 45.700	172 19 37.40	352 19 01.42	Lamesa.....	4.1133705	12,982.86	42,594.6
	101 51 07.488	225 25 33.45	45 29 17.05	Southard.....	4.1798241	15,129.48	49,637.3
		277 59 45.69	98 03 33.78	Wasson.....	4.0465692	11,131.90	36,521.9
		33 16 35.7		Azimuth mark (R.M. no. 2).....			
Davenport, 1932.....	32 32 05.862	128 24 52.88	308 19 31.58	King.....	4.2975797	19,841.74	65,097.4
	101 41 10.984	157 11 42.15	337 10 06.66	Wasson.....	4.0672814	11,675.66	38,306.9
		255 31 46.2		Azimuth mark (R.M. no. 1).....			
Mosley, 1932.....	32 33 03.888	180 17 55.76	0 17 56.89	King.....	4.0223988	10,529.28	34,544.8
	101 51 09.595	230 58 14.06	51 02 03.01	Wasson.....	4.1541628	14,261.42	46,789.3
		276 29 00.46	96 34 22.47	Davenport.....	4.1964908	15,721.38	51,579.2
		260 15 49.3		Azimuth mark (R.M. no. 1).....			
Abrams, 1932.....	32 26 41.638	116 15 09.82	296 06 57.01	Mosley.....	4.4262505	26,683.98	87,545.7
	101 35 52.342	140 13 48.21	320 10 57.05	Davenport.....	4.1138819	12,998.16	42,644.8
		313 58 28.28	134 01 41.11	Ewart.....	4.1161507	13,066.24	42,868.2
		53 50 58.52	233 42 13.82	Epley.....	4.5020300	31,770.93	104,235.1
		36 08 38.7		Azimuth mark (R.M. no. 1).....			
Zihlman, 1932.....	32 25 26.199	163 33 45.06	343 32 19.43	Mosley.....	4.1673174	14,700.00	48,228.2
	101 48 30.164	222 56 08.86	43 00 04.70	Davenport.....	4.2259414	16,824.47	55,198.3
		263 14 56.50	83 21 42.95	Abrams.....	4.2995808	19,933.37	65,398.1
		282 56 09.07	103 06 07.84	Ewart.....	4.4767866	29,976.89	98,349.2
		19 29 27.41	199 27 28.37	Epley.....	4.2417719	17,449.06	57,247.5
		344 58 01.2		Azimuth mark (R.M. no. 1).....			
Woolsey, 1932.....	31 59 26.582	174 48 23.82	354 47 56.25	Stanton.....	4.1771907	15,088.02	49,337.2
	101 45 32.022	233 06 25.33	53 16 24.27	Williams.....	4.5673274	36,925.58	121,146.7
		247 47 26.0		Azimuth mark (R.M. no. 1).....			

Curry, 1932.....	31 57 01.429	100 55 21.86	280 47 31.81	Woolsey.....	4.3753840	23,734.72	77,869.7
	101 30 44.266	128 20 02.58	308 11 44.09	Stanton.....	4.4969533	31,401.71	103,023.8
		193 16 47.18	13 18 54.42	Williams.....	4.4366065	27,327.92	89,658.3
		75 45 20.0		Azimuth mark (R.M. no. 2).....			
Medlin, 1932.....	31 47 30.173	173 16 24.32	353 15 31.95	Woolsey.....	4.3467233	22,218.94	72,896.6
	101 43 52.883	229 37 03.27	49 43 59.67	Curry.....	4.4344018	27,189.54	89,204.3
		165 21 34.9		Azimuth mark (R.M. no. 2).....			
Garden, 1932.....	31 48 48.018	83 05 58.65	262 59 24.89	Medlin.....	4.2966692	19,800.18	64,961.1
	101 31 25.699	131 33 07.76	311 25 40.51	Woolsey.....	4.4725811	29,688.01	97,401.4
		184 05 43.72	4 06 06.61	Curry.....	4.1828760	15,236.18	49,987.4
		117 29 35.9		Azimuth mark (R.M. no. 2).....			
Bigby, 1932.....	31 39 45.433	170 42 50.53	350 42 03.75	Medlin.....	4.1614914	14,504.12	47,585.6
	101 42 23.920	225 59 13.18	46 04 59.43	Garden.....	4.3815169	24,072.26	78,977.1
		258 03 05.5		Azimuth mark (R.M. no. 1).....			
Shields, 1932.....	31 39 58.658	88 52 33.68	268 45 59.23	Bigby.....	4.2966484	19,799.23	64,958.0
	101 29 52.508	122 12 51.60	302 05 29.65	Medlin.....	4.4171568	26,131.05	85,731.6
		171 27 02.07	351 26 13.05	Garden.....	4.2171575	16,487.60	54,063.1
		340 06 36.8		Azimuth mark (R.M. no. 2).....			
Kanz, 1932.....	31 32 20.022	185 56 16.25	5 56 44.63	Bigby.....	4.1396363	13,792.29	45,250.2
	101 43 18.080	236 18 38.51	56 25 40.65	Shields.....	4.4066208	25,504.74	83,676.8
		344 40 09.5		Azimuth mark (R.M. no. 1).....			
Ricker, 1932.....	31 31 31.720	94 27 53.72	274 21 31.48	Kanz.....	4.2864318	19,338.90	63,447.7
	101 31 07.192	130 29 24.11	310 23 29.57	Bigby.....	4.3699914	23,441.82	76,908.7
		187 10 54.94	7 11 34.07	Shields.....	4.1969163	15,736.80	51,629.8
		224 50 06.6		Azimuth mark (R.M. no. 1).....			
Fence (U.S.G.S.), 1932.....	31 24 04.667	189 56 44.11	9 57 37.05	Kanz.....	4.1900292	15,489.21	50,817.5
	101 44 59.493	237 52 05.50	57 59 19.92	Ricker.....	4.4138090	25,930.39	85,073.3
		257 33 22.4		Azimuth mark (R.M. no. 1).....			
Hughes, 1932.....	31 23 09.773	94 13 26.80	274 05 48.56	Fence (U.S.G.S.).....	4.3674081	23,302.80	76,452.6
	101 30 19.801	129 34 16.85	309 27 30.64	Kanz.....	4.4254373	26,634.06	87,381.9
		175 22 33.67	355 22 06.94	Ricker.....	4.1906014	15,509.63	50,884.5
		183 58 58.2		Azimuth mark (R.M. no. 1).....			
Low (U.S.G.S.), 1932.....	31 12 04.462	161 54 26.12	341 52 03.59	Fence (U.S.G.S.).....	4.3680430	23,336.89	76,564.4
	101 40 25.155	217 57 34.76	38 02 49.19	Hughes.....	4.4150265	26,003.18	85,312.1
		284 36 24.9		Azimuth mark (R.M. no. 1).....			
Japson (U.S.G.S.), 1932.....	31 17 40.714	49 02 29.83	228 58 36.21	Low (U.S.G.S.).....	4.1983128	15,787.48	51,796.1
	101 32 54.802	121 44 23.04	301 38 06.03	Fence (U.S.G.S.).....	4.3524020	22,511.37	73,856.1
		202 00 11.08	22 01 31.69	Hughes.....	4.0386698	10,931.25	35,863.6
		322 38 09.7		Azimuth mark (R.M. no. 2).....			

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Shell, 1932.....	° ' "	° ' "	° ' "	Low (U.S.G.S.).....	3.8384168	6,893.13	22,615.2
	31 08 26.593	166 45 22.74	346 44 51.87	Japson (U.S.G.S.).....	4.3000351	19,954.24	65,466.5
	101 39 25.504	211 11 15.43	31 14 37.93	Azimuth mark (R.M. no. 1).....			
Cox (U.S.G.S.), 1932.....	31 08 43.121	88 56 09.65	268 47 47.48	Shell.....	4.4103747	25,726.14	84,403.2
	101 23 14.524	102 52 26.29	282 43 32.81	Low (U.S.G.S.).....	4.4469731	27,988.08	91,824.2
		137 11 24.29	317 06 23.52	Japson (U.S.G.S.).....	4.3537896	22,583.41	74,092.4
Carroll (U.S.G.S.), 1932.....		106 07 48.4		Azimuth mark (R.M. no. 1).....			
	31 07 18.441	97 21 49.71	277 16 30.85	Shell.....	4.2168012	16,474.08	54,048.7
	101 29 08.746	254 26 38.52	74 29 41.67	Cox (U.S.G.S.).....	3.9885522	9,739.85	31,954.8
Powell, 1932.....		138 56 54.0		Azimuth mark (R.M. no. 2).....			
	31 00 28.693	150 45 13.04	330 42 32.43	Shell.....	4.2271524	16,871.45	55,352.4
	101 34 14.343	212 40 49.85	32 43 27.54	Carroll (U.S.G.S.).....	4.1759681	14,995.75	49,198.6
Schneeman, 1932.....		228 54 40.77	49 00 21.36	Cox (U.S.G.S.).....	4.3652993	23,189.93	76,082.3
		176 10 01.8		Azimuth mark (R.M. no. 2).....			
	31 00 40.500	88 37 44.52	268 32 57.78	Powell.....	4.1693465	14,768.84	48,454.1
Crockett, 1932.....	101 24 57.761	151 31 06.03	331 28 56.51	Carroll (U.S.G.S.).....	4.1444178	13,944.98	45,751.2
		190 25 30.44	10 26 23.73	Cox (U.S.G.S.).....	4.1793456	15,112.83	49,582.7
		188 34 58.4		Azimuth mark (R.M. no. 1).....			
Shannon, 1932.....	30 55 23.075	180 25 41.13	0 25 42.49	Powell.....	3.9736839	9,412.04	30,879.3
	101 34 16.994	236 35 19.01	56 40 06.76	Schneeman.....	4.2497206	17,771.36	58,304.9
		286 08 08.5		Azimuth mark (R.M. no. 1).....			
Todd, 1932.....	30 50 37.951	123 57 35.16	303 53 22.89	Crockett.....	4.1968044	15,732.74	51,616.5
	101 26 05.513	144 31 50.41	324 27 39.19	Powell.....	4.3492237	22,347.23	73,317.5
		185 31 55.31	5 32 30.13	Schneeman.....	4.2705129	18,642.88	61,164.2
University, 1932.....		327 42 32.1		Azimuth mark (R.M. no. 1).....			
	30 46 52.903	171 51 13.28	351 50 29.84	Crockett.....	4.2006121	15,871.28	52,071.0
	101 32 52.289	206 16 40.45	26 20 44.11	Schneeman.....	4.4539067	28,431.95	93,280.5
Massie, 1932.....		237 18 46.92	57 22 15.28	Shannon.....	4.1086670	12,843.01	42,135.8
		171 47 51.8		Azimuth mark (R.M. no. 2).....			
Longhorn, 1932.....	30 41 22.123	184 35 49.09	4 36 04.83	Todd.....	4.0094166	10,219.19	33,527.5
	101 33 23.092	214 10 44.61	34 14 28.44	Shannon.....	4.3159239	20,697.79	67,906.0
		175 10 14.7		Azimuth mark (R.M. no. 1).....			
Lee, 1932.....	30 45 00.989	69 01 16.39	248 55 39.73	University.....	4.2738208	18,785.42	61,631.8
	101 22 24.060	101 42 00.52	281 36 39.16	Todd.....	4.2319528	17,058.97	55,967.6
		150 26 47.45	330 24 54.06	Shannon.....	4.0766627	11,930.61	39,142.3
Hoover, 1932.....		49 58 23.8		Azimuth mark (R.M. no. 2).....			
	30 39 07.170	142 40 38.22	322 39 37.49	University.....	3.7182091	5,226.48	17,147.2
	101 31 24.031	232 47 26.36	52 52 02.05	Massie.....	4.2560772	18,033.38	59,164.5
Henderson, 1932.....		226 03 20.7		Azimuth mark (R.M. no. 1).....			
	30 33 34.552	189 17 33.53	9 18 18.62	University.....	4.1640617	14,590.21	47,868.0
	101 34 51.613	208 20 52.81	28 22 38.49	Longhorn.....	4.0659516	11,639.96	38,188.8
Pierce, 1932.....		175 15 11.4		Azimuth mark (R.M. no. 1).....			
	30 36 08.267	77 04 10.92	256 57 38.96	Lee.....	4.3235955	21,066.65	69,116.2
	101 22 01.182	110 13 10.31	290 08 23.56	Longhorn.....	4.2033104	15,970.20	52,395.6
Mitchell, 1932.....		118 04 27.58	297 58 39.99	University.....	4.3132200	20,569.32	67,484.5
		177 52 32.40	357 52 20.73	Massie.....	4.2152724	16,416.19	53,858.8
		307 18 10.2		Azimuth mark (R.M. no. 1).....			
Cauthorn, 1932.....	30 26 14.812	186 24 17.52	6 24 46.47	Lee.....	4.1343790	13,626.33	44,705.7
	101 35 48.650	230 18 17.97	50 25 18.19	Henderson.....	4.4570852	28,647.40	93,987.3
Mills, 1932.....	30 26 55.218	86 25 46.45	266 19 33.21	Hoover.....	4.2943382	19,694.19	64,613.4
	101 23 32.028	124 12 27.93	304 06 42.97	Lee.....	4.3404436	21,899.97	71,850.2
		188 05 15.07	8 06 01.21	Henderson.....	4.2355735	17,201.79	56,436.2
University, 1932.....		331 07 57.6		Azimuth mark (R.M. no. 2).....			
	30 19 33.143	186 23 49.79	6 24 16.07	Hoover.....	4.0950363	12,446.19	40,833.9
	101 36 40.619	237 03 30.86	57 10 09.77	Pierce.....	4.3991729	25,071.07	82,254.0
Massie, 1932.....		318 26 37.01	138 34 54.80	Blue.....	4.6017621	39,972.57	131,143.3
		350 02 24.9		Azimuth mark (R.M. no. 1).....			
Longhorn, 1932.....	30 12 21.586	120 05 13.81	299 58 00.29	Mitchell.....	4.4241579	26,555.71	87,124.9
	101 22 20.492	139 58 35.20	319 51 47.19	Hoover.....	4.5254673	33,532.60	110,014.9
		175 56 30.06	355 55 53.94	Pierce.....	4.4308703	26,969.34	88,481.9
Schneeman, 1932.....		348 12 44.65	168 13 49.78	Blue.....	4.2307854	17,013.18	55,817.4
		47 16 19.84	227 09 34.70	Babb.....	4.4691422	29,453.86	96,633.2
		224 22 26.5		Azimuth mark (R.M. no. 1).....			
Cox (U.S.G.S.), 1932.....	30 12 21.421	173 36 20.12	353 35 52.01	Mitchell.....	4.1263620	13,377.10	43,888.0
	101 35 44.850	269 55 48.95	90 02 33.63	Cauthorn.....	4.3327207	21,513.98	70,583.8
		303 35 41.45	123 43 30.35	Blue.....	4.4776939	30,039.58	98,554.9
Shell, 1932.....		0 14 18.31	180 14 16.75	Babb.....	4.3010680	20,001.29	65,620.9
		343 10 15.9		Azimuth mark (R.M. no. 2).....			

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points							
Butterfield eccentric, 1932.....	35 02 39.479 101 36 42.706	2 20	182 20	Butterfield.....	0.949634	8.905	29.22
Amarillo municipal water tank, final (near Seventh and Bonham Streets), 1932. ¹	35 12 30.79 101 51 27.39	309 04 18 1 00 26	129 12 47 181 00 10	Butterfield..... Neal.....	4.460608 4.608135	28,880.7 40,563.5	94,753 133,082
Amarillo Country Club, water tank, final, 1932. ¹	35 12 25.25 101 53 37.06	305 02 03 346 38 46	125 11 47 166 40 22	Butterfield..... Merry.....	4.496890 4.264447	31,397.1 18,384.3	103,009 60,316
Amarillo, Santa Fe Building, chimney, 1932. ¹	35 12 15.60 101 50 15.42	310 44 11 2 48 47	130 51 59 182 48 28	Butterfield..... Merry.....	4.434310 4.245809	27,183.8 17,612.0	89,186 57,782
Amarillo, Price Memorial College, tank, 1932. ¹	35 13 46.84 101 47 15.50	322 02 42 14 53 23	142 08 46 194 51 20	Butterfield..... Merry.....	4.416235 4.324483	26,075.6 21,109.7	85,550 69,257
English Field, airway beacon, 1932.....	35 14 03.437 101 42 17.795	338 03 33.6 18 41 01.7 31 48 56.4	158 06 46.4 198 35 30.1 211 44 01.9	Butterfield..... Neal..... Merry.....	4.356570 4.661008 4.390956	22,728.5 45,815.0 24,601.2	74,568 150,311 80,712
Airway beacon no. 27, 1932. ¹	35 01 50.82 101 58 00.93	261 19 12 335 58 29	81 23 20 156 01 58	Merry..... Neal.....	4.043772 4.358066	11,060.4 22,806.9	36,287 74,826
Airway beacon no. 28, 1932.....	35 07 29.123 101 57 19.418	285 49 08.8 311 32 51.9 345 14 50.7	106 00 59.5 131 36 36.0 165 17 56.4	Butterfield..... Merry..... Neal.....	4.512919 4.120691 4.509508	32,577.6 13,203.6 32,322.7	106,882 43,319 106,045
Canyon, Randall County Courthouse cupola, flagstaff, 1932. ¹	34 58 45.52 101 55 39.79	224 55 28 339 21 02	44 58 14 159 23 11	Merry..... Neal.....	4.017758 4.208494	10,417.4 16,162.0	34,178 53,025
Canyon, West Texas State Normal School, water tank, final, 1932. ¹	34 58 56.74 101 54 54.82	221 22 27 343 40 23	41 24 47 163 42 05	Merry..... Neal.....	3.971614 4.207367	9,367.3 16,120.1	30,733 52,887
Airways blinker, 1932. ¹	34 50 58.71 102 24 17.42	246 42 56 270 42 20	67 02 06 91 00 50	Merry..... Neal.....	4.743515 4.693220	55,400.7 49,342.4	181,760 161,884
Happy, municipal water tank, 1932.....	34 44 39.209 101 51 19.428	175 13 23.5 246 52 54.2 324 29 48.8 7 35 42.6	355 13 02.9 67 00 24.9 144 36 08.7 187 35 21.0	Neal..... Wesley..... Shafer..... Klein.....	4.041081 4.339216 4.467679 3.861096	10,992.1 21,838.2 29,354.8 7,262.7	36,063 71,647 96,308 23,828

Tulia, municipal water tank, 1932.....	34 32 19.795 101 45 51.905	149 11 19.9 221 19 30.5 277 22 06.6 335 48 30.2 21 03 13.7 68 54 53.8	329 07 52.5 41 24 28.0 97 25 21.9 155 51 21.5 201 00 36.8 248 52 20.6	Klein..... Ackley..... Shafer..... Kress..... Bush..... Tulia.....	4.258927 4.305282 3.942865 4.275618 4.295043 3.868553	18,152.1 20,196.8 8,767.3 18,863.3 19,726.2 7,388.4	59,554 66,262 28,764 61,887 64,718 24,240
Tulia, Swisher County Courthouse cupola, final, 1932.	34 32 11.414 101 45 47.856	275 45 28.8 335 46 23.2 21 36 34.1 71 04 12.7	95 48 39.8 155 49 12.2 201 33 54.9 251 01 37.2	Shafer..... Kress..... Bush..... Tulia.....	3.936271 4.269174 4.290550 3.869061	8,635.2 18,585.5 19,523.2 7,397.1	28,331 60,976 64,052 24,269
Plainview municipal water tank, final, 1932.....	34 11 12.064 101 42 01.732	349 09 03.0 53 28 53.2 103 46 52.6 194 50 18.2 199 40 31.2	169 09 48.1 233 23 02.1 283 40 44.8 4 50 59.0 19 41 13.1	Rogers..... Teston..... Watson..... Kress..... Heath.....	4.039398 4.300144 4.236547 4.341050 3.753147	10,949.6 19,959.2 17,240.4 21,930.6 5,664.3	35,924 65,483 56,563 71,951 18,584
Kress, white church steeple, 1932. ¹	34 21 59.83 101 45 07.01	37 07 00 94 49 22	217 02 36 274 46 20	Watson..... Bush.....	4.298609 3.917128	19,888.8 8,262.8	65,252 27,109
Plainview, cotton mill water tank, final, 1932. ¹	34 11 43.92 101 42 17.46	348 09 27 100 50 31	168 09 21 280 43 32	Rogers..... Watson.....	4.078861 4.221088	11,991.2 16,637.5	39,341 54,585
North Plainview, junction of feed pipe and silver tank, 1932. ¹	34 11 57.89 101 42 20.97	49 28 32 99 24 46	229 22 52 279 18 49	Teston..... Watson.....	4.310767 4.216785	20,453.5 16,473.5	67,105 54,047
Hale Center, municipal water tank, final, 1932.	34 03 54.528 101 50 38.295	318 41 21.9 9 12 05.4 119 37 52.3 168 39 58.8 218 46 53.9 259 51 04.0	138 46 19.3 189 11 11.9 299 36 51.1 348 38 41.5 38 52 25.6 79 56 38.4	Stewart..... Holmes..... Teston..... Watson..... Heath..... Rogers.....	4.316124 4.185686 3.507451 4.253419 4.382937 4.191642	20,707.3 15,335.1 3,217.0 17,923.3 24,151.1 15,546.8	67,937 50,312 10,554 58,803 79,236 51,006
Abernathy, tallest black water tank, final, 1932. ¹	33 49 52.50 101 50 16.95	49 13 24 164 28 54	229 11 30 344 27 49	Foster..... Holmes.....	3.842969 4.049785	6,965.8 11,214.6	22,854 36,793
West Texas Utilities Co., tank (Tuco), 1932.....	33 52 20.710 101 50 36.162	305 45 30.6 27 40 24.4 158 06 34.4 246 50 41.4	125 50 31.0 207 38 41.0 338 05 40.0 66 55 37.1	Lincecum..... Foster..... Holmes..... Stewart.....	4.233206 4.012564 3.827635 4.170492	17,108.3 10,293.5 6,724.1 14,807.8	56,129 33,771 22,061 48,582
Petersburg, railroad water tank, final, 1932.....	33 52 35.027 101 35 49.400	328 30 00.4 40 32 08.4 120 24 15.8	148 31 08.1 220 28 55.1 300 20 56.8	Hale County, southeast corner..... Lincecum..... Stewart.....	3.777055 4.138078 4.026247	5,984.9 13,742.9 10,623.0	19,635 45,088 34,852
Hale County, southeast corner, 1932.....	33 49 49.386 101 33 47.790	66 07 37.25 130 28 25.67	246 03 16.43 310 23 59.06	Lincecum..... Stewart.....	4.1202118 4.2081847	13,189.00 16,150.45	43,270.9 52,986.9

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Hale County, southeast corner eccentric, 1932.	33 49 49.362 101 33 47.799	197 35	17 35	Hale County, southeast corner.....	9.883661	0.765	2.51
Idalou, municipal water tank, final, 1932.....	33 39 55.316 101 40 44.996	4 07 19.1 31 46 31.4 79 31 47.4 174 09 15.9 210 22 03.9	184 06 46.4 211 46 09.6 259 25 10.4 354 08 47.2 30 25 55.6	B.M. J 71 eccentric..... Holt..... McCauley..... Lincoecum..... Hale County, southeast corner.....	4.326390 3.284065 4.273623 4.114794 4.326756	21,202.6 1,923.5 18,776.9 13,025.5 21,220.5	69,562 6,311 61,604 42,734 69,621
Lorenzo, municipal water tank, final, 1932....	33 40 13.224 101 32 02.324	34 42 12.6 81 27 15.3 82 59 12.7	214 36 50.9 261 22 03.8 262 47 46.1	B.M. J 71 eccentric..... Holt..... McCauley.....	4.421288 4.165642 4.507524	26,380.8 14,643.4 32,175.4	86,551 48,043 105,562
Lubbock, municipal airport beacon, 1932.....	33 39 19.891 101 50 00.138	17 04 07.9 60 38 55.1 222 39 53.2	197 01 57.0 240 37 25.8 42 44 32.9	Shepard..... McCauley..... Lincoecum.....	4.318715 3.678432 4.281437	20,831.2 4,769.1 19,117.8	68,344 15,647 62,722
Lubbock, West Texas Institute of Technology, administration building, east cupola, 1932. ¹	33 34 59.86 101 52 25.54	11 12 54 175 52 12	191 12 04 355 52 03	Shepard..... McCauley.....	4.084065 3.754930	12,135.7 5,687.6	39,815 18,660
Lubbock, West Texas Institute of Technology, administration building, west cupola, 1932. ¹	33 34 59.86 101 52 28.86	10 49 00 176 43 56	190 48 12 356 43 49	Shepard..... McCauley.....	4.083481 3.754502	12,119.4 5,682.0	39,762 18,642
Hotel Lubbock, silver tank, final, 1932.....	33 35 05.461 101 50 52.244	310 46 28.2 21 33 02.0 152 54 25.7	130 51 31.0 201 31 19.9 332 53 25.2	B.M. J 71 eccentric..... Shepard..... McCauley.....	4.271652 4.113386 3.790892	18,691.8 12,983.3 6,178.6	61,325 42,596 20,271
B.M. J 71 (1930), 1932.....	33 28 28.744 101 41 44.099	204 04	24 04	B.M. J 71 eccentric.....	0.6939906	4.943	16.22
Lubbock, West Texas Institute of Technology, water tank, final, 1932.	33 35 30.931 101 52 33.227	307 46 09.3 9 32 27.6 175 24 04.9 177 26 00.1 218 39 38.8 249 15 48.5	127 52 07.9 189 31 41.3 355 23 26.8 357 25 55.6 38 45 43.0 69 21 58.9	B.M. J 71 eccentric..... Shepard..... Foster..... McCauley..... Lincoecum..... Holt.....	4.326444 4.115336 4.343700 3.673963 4.432081 4.265537	21,205.3 13,041.8 22,064.8 4,720.2 27,044.6 18,430.5	69,571 42,788 72,391 15,486 88,729 60,467
Lubbock, municipal standpipe, 1932.....	33 34 38.403 101 51 46.274	306 10 39.1 16 42 17.5 167 21 04.3 243 04 06.2	126 16 11.7 196 41 05.3 347 20 33.8 63 09 50.5	B.M. J 71 eccentric..... Shepard..... McCauley..... Holt.....	4.284757 4.069597 3.812342 4.254699	19,264.5 11,738.1 6,491.5 17,976.2	63,204 38,511 21,298 58,977
Southeast Lubbock municipal water tank, final, 1932.	33 34 47.230 101 50 00.246	312 16 24.1 27 57 38.7 145 34 55.0 239 23 20.8	132 20 58.1 207 55 27.9 325 33 25.8 59 28 06.4	B.M. J 71 eccentric..... Shepard..... McCauley..... Holt.....	4.238434 4.115106 3.866250 4.188850	17,315.5 13,034.8 7,349.4 15,447.2	56,809 42,765 24,112 50,680
North Lubbock municipal water tank, final, 1932.	33 35 29.004 101 50 46.295	312 43 41.2 21 02 03.6 148 08 38.9 245 33 43.3	132 48 40.8 201 00 18.3 328 07 35.2 65 38 54.5	B.M. J 71 eccentric..... Shepard..... McCauley..... Holt.....	4.280134 4.137192 3.749900 4.201566	19,060.5 13,714.9 5,622.1 15,906.2	62,534 44,996 18,445 52,186
Slaton cotton compress, silver water tank, final, 1932.	33 26 43.863 101 38 41.826	320 13 01.9 22 27 44.9 60 15 00.7 98 12 04.9 124 31 50.5 169 34 20.2	140 14 49.3 202 25 58.6 240 06 57.4 278 03 40.4 304 30 10.1 349 32 50.5	Poole..... Hillen..... Thomas..... Shepard..... B.M. J 71 eccentric..... Holt.....	3.896323 4.116650 4.417800 4.377892 3.756656 4.364200	7,876.3 13,081.3 26,169.8 23,872.2 5,710.3 23,131.3	25,841 42,918 85,859 78,321 18,735 75,890
E.S.E. Lubbock, 1932.....	33 23 42.031 101 33 22.871	81 58 27.8	261 57 19.6	Poole.....	3.5098864	3,235.09	10,613.8
Poole, 1932.....	33 23 27.353 101 35 26.819	59 00 37.2 133 39 42.7	238 57 03.7 313 36 14.9	Hillen..... B.M. J 71 eccentric.....	4.068668 4.129132	11,713.0 13,462.7	38,428 44,169
Slaton municipal water tank, final, 1932.....	33 26 23.342 101 38 37.215	317 46 03.3 24 04 08.5 61 35 33.3 99 39 00.7 128 44 07.9 169 33 59.1	137 47 48.1 204 02 19.6 241 27 27.4 279 30 33.6 308 42 24.9 349 32 26.8	Poole..... Hillen..... Thomas..... Shepard..... B.M. J 71 eccentric..... Holt.....	3.864567 4.098556 4.414416 4.381800 3.791227 4.376114	7,320.9 12,547.5 25,966.7 24,088.0 6,183.4 23,774.6	24,019 41,166 85,192 79,029 20,287 78,000
Slaton schoolhouse, brick chimney, 1932 ¹	33 25 46.00 101 38 37.27	26 24 00 136 09 03	206 22 11 316 07 20	Hillen..... B.M. J 71 eccentric.....	4.060922 3.842837	11,505.9 6,960.4	37,749 22,836
Posey, black chimney on factory, 1932 ¹	33 28 53.49 101 42 30.86	302 04 06 356 42 32	122 04 32 176 42 52	B.M. J 71 eccentric..... Hillen.....	3.154449 4.207097	1,427.1 16,110.1	4,682 52,855
Wilson (Lubbock County), north of, church belfry, final, 1932 ¹	33 19 19.88 101 43 41.41	239 59 02 340 57 17	60 00 00 160 58 54	Hillen..... Bartley.....	3.501768 4.148111	3,175.2 14,064.1	10,417 46,142
Wilson (Lubbock County), southwest of, church belfry, final, 1932 ¹	33 19 05.04 101 43 40.23	233 02 26 340 26 54	53 03 24 160 28 31	Hillen..... Bartley.....	3.531796 4.134250	3,402.5 13,622.3	11,163 44,692

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Tahoka municipal water tank, final, 1932.....	33 10 16.878 101 47 39.158	21 24 02.7	201 21 55.6	Pearce.....	4.218701	16,546.3	54,286
		100 46 22.0	280 43 06.2	Crosby.....	3.974622	9,432.4	30,946
		153 06 28.2	333 03 21.0	Thomas.....	4.290203	19,507.6	64,000
		252 15 20.5	72 19 07.6	Bartley.....	4.052462	11,284.0	37,021
		320 07 43.3	140 10 59.7	Pennington.....	4.162811	14,548.3	47,731
O'Donnell municipal water tank, final, 1932..	32 58 08.831 101 49 48.373	158 34 31.8	158 38 21.7	Huff.....	4.477133	30,000.8	98,428
		30 10 31.8	210 09 05.9	Akins.....	3.912517	8,175.6	26,823
		159 04 39.5	339 03 43.2	Pearce.....	3.876049	7,517.1	24,662
		166 15 00.8	346 12 56.1	Crosby.....	4.396242	24,902.4	81,701
		208 34 47.8	28 39 44.9	Bartley.....	4.469255	29,461.5	96,658
Lamesa municipal water tank, final, 1932.....	32 43 57.093 101 57 01.491	228 22 25.8	48 26 52.2	Pennington.....	4.229447	16,960.8	55,646
		290 59 55.6	111 04 55.3	Huff.....	4.185666	15,334.4	50,310
		340 55 37.8	160 58 39.6	Southard.....	4.426158	26,678.3	87,527
		200 26 33.5	20 29 02.5	Akins.....	4.310916	20,460.5	67,127
		230 55 10.9	51 04 04.3	Huff.....	4.517719	32,939.7	108,070
Lamesa, West Texas Dairy Products Co., concrete stack, 1932.	32 44 16.940 101 56 58.604	246 20 38.9	66 23 14.4	Lamesa.....	3.912078	8,167.3	26,796
		267 01 16.6	87 08 11.9	Southard.....	4.301485	20,021.0	65,686
		298 47 04.2	118 54 03.7	Wasson.....	4.363736	23,106.6	75,809
		316 06 03.3	136 09 14.5	King.....	4.124054	13,306.2	43,655
		200 51 21.4	20 53 48.8	Akins.....	4.298020	19,861.9	65,164
Muchakooogo (Mushaway) Peak, south side, white outcrop, 1932.	32 43 24.915 101 24 01.934	250 12 16.4	70 14 50.3	Lamesa.....	3.896029	7,871.0	25,823
		268 45 59.8	88 52 53.6	Southard.....	4.299363	19,223.4	65,365
		300 11 21.0	120 18 19.0	Wasson.....	4.368141	23,342.2	76,582
		318 06 02.8	138 09 12.5	King.....	4.136815	13,703.0	44,957
		52 07 51.1	231 58 36.3	Davenport.....	4.531690	34,016.5	111,602
Ackerly, small black tank, final, 1932.....	32 31 33.198 101 42 55.905	72 07 55.6	251 57 06.3	Wasson.....	4.517702	32,938.4	108,065
		93 44 21.2	273 33 26.1	Southard.....	4.499844	31,611.4	103,712
		309 02 54.8	129 06 42.2	Abrams.....	4.153705	14,246.4	46,740
		102 16 19.4	282 11 53.8	Mosley.....	4.119976	13,181.8	43,247
		249 48 53.7	69 49 50.1	Davenport.....	3.464945	2,917.1	9,571
Brick schoolhouse, white stone slab over door, 1932. ¹	32 34 53.69 101 51 04.78	346 59 12	167 00 36	Zihlman.....	4.253833	17,940.4	58,859
		2 07 35	182 07 32	Mosley.....	3.529496	3,384.5	11,104
Stanton, airway beacon no. 27, 1932.....	32 09 34.410 101 48 44.948	157 06 06.9	337 04 16.2	Epley.....	4.145157	13,968.7	45,829
		212 30 50.8	32 37 43.7	Abrams.....	4.574567	37,546.3	123,183
		232 37 51.6	52 47 56.0	Evart.....	4.571104	37,248.1	122,205
		63 27 37.4	243 19 35.8	Stanton.....	4.423133	26,493.1	86,919
		98 19 43.9	278 08 35.2	Epley.....	4.520313	33,137.0	108,717
Big Spring airport beacon, 1932.....	32 13 58.018 101 31 19.758	163 09 36.2	343 07 10.4	Abrams.....	4.390545	24,577.9	80,636
		188 57 21.7	8 58 08.2	Evart.....	4.165043	14,623.2	47,976
		63 30 21	243 20 49	Stanton.....	4.497864	31,467.6	103,240
		121 14 59	301 04 17	Zihlman.....	4.564572	36,692.1	120,381
		17 41 40	197 40 23	Shepard.....	4.074871	11,881.5	38,961
Lubbock municipal high school, tip of dome, 1932. ¹	33 34 40.90 101 51 37.09	165 09 23	345 08 48	McCauley.....	3.811118	6,473.2	21,237
		154 56 35.0	334 54 02.4	Epley.....	4.247658	17,687.2	58,029
		258 30 59.6	78 42 00.6	Williams.....	4.521031	33,191.8	108,897
		289 53 26.9	109 54 00.1	Stanton.....	3.240707	1,740.6	5,711
		307 14 21.5	127 23 13.2	Curry.....	4.519288	33,058.9	108,461
Stanton, Martin County Courthouse, tip of dome, 1932.	32 07 52.034 101 47 26.394	349 05 03.1	169 06 03.8	Woolsey.....	4.200165	15,855.0	52,018
		154 57 26.3	334 54 54.5	Epley.....	4.246012	17,620.2	57,809
		258 37 36.5	78 48 38.2	Williams.....	4.521293	33,211.8	108,962
		291 18 18.8	111 18 52.7	Stanton.....	3.253245	1,791.6	5,878
		307 17 10.0	127 26 02.4	Curry.....	4.520093	33,120.2	108,662
Stanton municipal water tank, final, 1932.....	32 07 53.942 101 47 27.628	349 00 34.5	169 01 35.9	Woolsey.....	4.201910	15,918.8	52,227
		251 53 43.6	71 59 17.1	Stanton.....	4.238276	17,309.2	56,789
		255 03 58.5	75 19 59.7	Williams.....	4.690079	48,986.8	160,718
		288 46 55.9	109 00 46.9	Curry.....	4.638264	43,477.4	142,642
		298 16 25.2	118 22 25.7	Woolsey.....	4.306559	20,256.2	66,457
Airway beacon no. 26, 1932.....	32 04 38.605 101 56 51.592	306 02 18.7	126 15 46.1	Garden.....	4.695763	49,632.1	162,835
		316 50 48.0	137 05 03.0	Shields.....	4.794915	62,361.3	204,597
		271 42 49.9	91 52 52.5	Woolsey.....	4.475136	29,863.2	97,976
		275 39 32.1	95 57 24.4	Curry.....	4.727851	53,438.1	175,321
		305 12 37.7	125 23 30.9	Medlin.....	4.599938	39,805.0	130,594
Midland municipal tank, final, 1932.....	31 59 56.995 102 04 29.103	271 35 22	91 45 27	Woolsey.....	4.477130	30,000.6	98,427
		305 01 24	125 12 20	Medlin.....	4.600799	39,884.0	130,853
		247 00 59.3	67 19 46.0	Stanton.....	4.781788	60,504.5	198,505
		250 18 04.1	70 47 17.8	Williams.....	4.963475	91,933.8	301,619
		261 23 11.4	81 42 23.5	Woolsey.....	4.761915	57,798.3	189,627
Midland hotel sign, 1932. ¹	31 59 55.03 102 04 34.41	266 54 42.8	87 21 43.9	Curry.....	4.906350	80,602.8	264,444
		277 46 46.7	98 13 22.7	Garden.....	4.904407	80,254.1	263,300
		282 36 33.4	102 56 34.7	Medlin.....	4.787867	61,557.4	201,303
		293 57 54.2	114 18 40.2	Bigby.....	4.833672	68,182.4	223,695
		247 00 59.3	67 19 46.0	Stanton.....	4.781788	60,504.5	198,505
Airway beacon no. 23 (airway beacon, third southwest of Stanton), 1932.	31 54 50.718 102 21 48.932	250 18 04.1	70 47 17.8	Williams.....	4.963475	91,933.8	301,619
		261 23 11.4	81 42 23.5	Woolsey.....	4.761915	57,798.3	189,627
		266 54 42.8	87 21 43.9	Curry.....	4.906350	80,602.8	264,444
		277 46 46.7	98 13 22.7	Garden.....	4.904407	80,254.1	263,300
		282 36 33.4	102 56 34.7	Medlin.....	4.787867	61,557.4	201,303

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Airway beacon no. 24, Midland landing field, 1932.	31 56 02.265	241 45 31.8	61 58 55.9	Stanton.....	4.654301	45,112.9	148,008
	102 11 40.117	247 54 20.4	68 18 11.2	Williams.....	4.881968	76,202.3	250,007
		268 12 04.7	88 33 44.0	Curry.....	4.809754	64,528.9	211,709
		281 43 26.3	102 04 41.2	Garden.....	4.811952	64,856.3	212,783
		289 40 12.7	109 54 52.8	Medlin.....	4.668196	46,579.6	152,820
		294 02 25.8	114 24 27.2	Shields.....	4.859337	72,333.1	237,313
		302 56 41.9	123 12 07.3	Bigby.....	4.741402	55,131.8	180,878
Shell pumping station, black water tank, final, 1932.	31 49 05.292	316 14 28.2	136 14 38.4	Garden.....	2.867238	736.6	2,417
	101 31 45.070	44 19 40.0	224 14 03.9	Bigby.....	4.381757	24,085.6	79,021
		81 21 10.3	261 14 46.8	Medlin.....	4.287069	19,367.3	63,541
Shell pumping station, storage tank, final, 1932.	31 49 01.756	185 43 13.9	5 43 43.7	Curry.....	4.171672	14,848.1	48,714
	101 31 40.620	317 09 18.0	137 09 25.9	Garden.....	2.761257	577.1	1,893
		44 42 30.5	224 36 52.2	Bigby.....	4.381837	24,090.0	79,035
Best municipal water tank, 1932 ¹	31 13 03.44	70 51 46	250 50 04	Low (U.S.G.S.).....	3.743219	5,536.3	18,164
	101 37 07.59	148 32 05	328 28 00	Fence (U.S.G.S.).....	4.378098	23,883.5	78,358
Texon municipal water tank, 1932 ¹	31 12 35.90	33 08 15	213 08 03	Low (U.S.G.S.).....	3.063042	1,156.2	3,793
	101 40 01.28	159 37 40	339 35 06	Fence (U.S.G.S.).....	4.354700	22,630.8	74,248
Oil derrick, 1932 ¹	31 19 57.71	205 54 03	25 54 59	Hughes.....	3.817956	6,575.9	21,574
	101 32 08.52	16 10 48	196 10 24	Japson (U.S.G.S.).....	3.642783	4,393.2	14,413
Shell pumping station, black water tank, 1932.	31 08 32.406	331 31 01.7	151 33 38.9	Powell.....	4.229028	16,944.5	55,592
	101 39 18.963	44 03 48.8	224 03 45.4	Shell.....	2.396462	249.2	818
		164 58 49.0	344 58 14.8	Low (U.S.G.S.).....	3.830063	6,761.8	22,184
Big Lake municipal water tank, final, 1932.....	31 11 30.632	143 45 57.4	323 43 13.5	Japson (U.S.G.S.).....	4.150272	14,134.2	46,372
	101 27 38.912	306 21 48.6	126 24 05.4	Cox (U.S.G.S.).....	3.939369	8,697.0	28,533
		347 56 51.0	167 58 14.2	Schneeman.....	4.311165	20,472.2	67,166
		17 02 20.9	197 01 34.4	Carroll (U.S.G.S.).....	3.909714	8,123.0	26,650
University of Texas, survey station, 1932 ¹	30 40 46.73	337 19 37	157 20 01	Longhorn.....	3.521481	3,322.6	10,901
	101 32 12.13	119 59 35	299 58 58	University.....	3.338566	2,180.5	7,154
University of Texas, survey station, 1932.....	30 39 07.347	355 23 37.3	175 23 37.3	Longhorn.....	0.736795	5.455	17.90
	101 31 24.047	28 21 45.9	208 20 00.2	Lee.....	4.066123	11,644.6	38,204
		142 38 41.8	322 37 41.1	University.....	3.717828	5,221.9	17,132
University of Texas, land corner 27, 1932.....	30 45 00.979	268 41 43.1	88 41 43.4	Massie.....	1.1287223	13.450	44.13
	101 22 24.566						

Waco-Mansfield arc

<i>Principal points</i>							
Pancake, 1919.....	31 38 02.857	17 06 26.42	197 03 43.74	King.....	4.4464301	27,953.11	91,709.5
	97 48 25.488	127 40 54.05	307 38 36.04	Scoggins.....	3.9420686	8,751.22	28,711.3
Rainer, 1919.....	31 27 06.767	72 13 48.61	252 07 08.81	King.....	4.3278871	21,275.86	69,802.5
	97 40 49.847	143 29 31.90	323 23 15.72	Scoggins.....	4.5026127	31,813.59	104,375.1
		149 17 20.29	329 13 21.93	Pancake.....	4.3712697	23,510.92	77,135.4
Myers, 1919.....	31 37 37.012	8 26 50.07	188 25 52.96	Rainer.....	4.2927691	19,623.17	64,380.3
	97 39 00.672	93 06 08.01	273 01 11.80	Pancake.....	4.1733629	14,906.06	48,904.3
		105 47 29.89	285 40 15.48	Scoggins.....	4.3552131	22,657.56	74,335.7
Oglesby, 1919.....	31 26 27.800	94 45 54.31	274 41 07.46	Rainer.....	4.1634060	14,568.27	47,796.1
	97 31 40.002	150 36 27.33	330 32 36.86	Myers.....	4.3740739	23,663.22	77,635.1
Simpson, 1919.....	31 36 03.463	10 44 59.45	190 43 52.81	Oglesby.....	4.2563744	18,045.73	59,305.0
	97 29 32.537	47 16 46.88	227 10 52.72	Rainer.....	4.3863567	24,342.02	79,862.1
		100 55 55.43	280 50 57.62	Myers.....	4.1832584	15,249.60	50,031.4
Barcus, 1919.....	31 27 58.938	84 05 43.55	263 56 53.81	Oglesby.....	4.4305710	26,950.76	88,421.0
	97 14 44.810	122 34 12.35	302 26 28.07	Simpson.....	4.4435628	27,769.17	91,106.0
Payne, 1919.....	31 39 52.749	340 42 50.12	160 45 22.64	Barcus.....	4.3671426	23,288.56	76,405.9
	97 19 36.172	37 39 05.50	217 32 46.73	Oglesby.....	4.4954100	31,290.32	102,658.3
		65 50 49.26	245 45 36.48	Simpson.....	4.2362730	17,229.51	56,527.2
Battle, 1919.....	31 33 53.108	72 03 34.60	251 52 30.80	Barcus.....	4.5469980	35,236.93	115,606.5
	96 53 34.951	105 10 44.40	284 57 05.99	Payne.....	4.6295630	42,615.05	139,812.9
West, 1919.....	31 47 12.323	321 07 02.64	141 13 37.57	Battle.....	4.4996471	31,597.09	103,664.8
	97 06 07.051	21 03 02.34	200 58 30.84	Barcus.....	4.5803972	38,053.73	124,847.9
		57 37 11.80	237 30 06.32	Payne.....	4.4020839	25,239.68	82,807.2
Wille, 1919.....	31 42 37.565	10 01 03.80	190 00 07.04	Battle.....	4.2149098	16,402.49	53,813.8
	96 51 46.758	110 33 19.03	290 25 46.35	West.....	4.3833236	24,172.61	79,306.3
Horn, 1919.....	31 33 01.215	94 01 41.61	273 54 04.01	Battle.....	4.3639026	23,115.46	75,838.0
	96 39 00.596	131 22 34.86	311 15 53.06	Wille.....	4.4295012	26,884.45	88,203.4

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Hubbard, 1919.....	31 48 53.525	18 16 58.08	198 15 41.60	Wilie.....	4.0861574	12,194.31	40,007.5
	96 49 21.474	83 21 11.04	263 12 21.13	West.....	4.4254520	26,634.96	87,384.9
Tehuacana, 1919.....	31 44 16.592	24 48 36.71	204 45 25.48	Horn.....	4.3600478	22,911.20	75,167.8
	96 32 56.104	84 13 56.35	264 04 01.82	Wilie.....	4.4759975	29,922.48	98,170.7
Fallon, 1919.....	31 34 20.645	84 21 03.18	264 12 58.16	Hubbard.....	4.4360698	27,294.16	89,547.6
	96 23 33.956	141 08 25.97	321 03 30.95	Horn.....	4.3902329	24,560.26	80,578.1
Kirvin, 1919.....	31 43 11.810	20 29 25.63	200 27 24.01	Tehuacana.....	4.3726336	23,584.88	77,378.1
	96 19 42.147	58 27 00.99	238 16 53.37	Fallon.....	4.2421056	17,462.47	57,291.5
Teague, 1919.....	31 37 34.780	67 27 40.92	247 22 55.12	Horn.....	4.5545504	35,855.06	117,634.5
	96 14 28.502	141 30 21.82	321 27 37.13	Tehuacana.....	4.3221445	20,996.38	68,885.6
Pilot, 1919.....	31 44 48.475	54 10 18.95	234 04 10.66	Fallon.....	4.1923696	15,572.90	51,092.1
	96 02 47.347	83 42 53.52	263 33 59.77	Kirvin.....	4.1227655	13,266.78	43,526.1
Burleson, 1919.....	31 36 01.341	83 39 16.97	263 30 09.54	Teague.....	4.3577686	22,791.27	74,774.4
	96 06 08.808	102 21 42.07	282 17 20.14	Kirvin.....	4.4294181	26,879.31	88,186.5
		121 48 22.39	301 41 15.48	Fallon.....	4.4429520	27,730.13	90,977.9
		198 05 09.45	18 06 55.23	Teague.....	4.1297476	13,481.79	44,231.5
				Kirvin.....	4.4013566	25,197.45	82,668.6
Lee, 1919.....	31 37 30.372	82 28 51.61	262 22 01.62	Pilot.....	4.2325037	17,080.62	56,038.7
	95 53 06.638	131 27 43.28	311 22 38.26	Burleson.....	4.3180271	20,798.26	68,235.6
Wilkerson, 1919.....	31 55 14.231	26 34 38.32	206 29 10.94	Pilot.....	4.3095423	20,395.87	66,915.4
	95 42 44.913	46 14 20.74	226 02 01.77	Lee.....	4.5637606	36,623.56	120,155.8
		58 43 25.99	238 32 51.76	Burleson.....	4.7096350	51,243.06	168,119.9
Concord, 1919.....	31 49 47.870	44 54 47.24	224 47 15.86	Pilot.....	4.5685545	37,030.07	121,489.5
	95 38 48.311	148 16 24.68	328 14 19.74	Lee.....	4.5056891	32,039.75	105,117.1
Camp, 1919.....	31 41 35.506	77 12 12.16	257 01 14.78	Wilkerson.....	4.0726248	11,820.20	38,780.1
	95 32 14.167	145 39 25.75	325 35 58.28	Lee.....	4.5295515	33,849.44	111,054.4
		146 42 14.22	326 36 41.78	Concord.....	4.2641719	18,372.65	60,277.6
Crockett, 1919.....	31 43 01.336	85 24 10.99	265 13 27.38	Wilkerson.....	4.4797915	30,185.02	99,032.0
	95 11 49.522	114 57 38.23	294 41 20.00	Camp.....	4.5099534	32,355.90	106,154.3
Lloyd, 1919.....	31 57 51.340	330 55 29.38	151 00 34.66	Wilkinson.....	4.7306007	53,765.12	176,394.4
	95 21 28.184	29 31 21.63	209 25 40.95	Crockett.....	4.4962623	31,351.78	102,860.0
Rusk, 1919.....	31 49 10.647	30 56 22.50	210 54 06.18	Camp.....	4.5381244	34,524.26	113,288.3
	95 07 30.608	126 08 20.40	306 00 57.89	Wilkinson.....	4.5299521	33,880.68	111,156.9
Smith, 1919.....	31 57 53.082	6 29 19.18	186 28 42.42	Crockett.....	4.1225134	13,259.08	43,500.8
	95 06 21.021	89 56 15.47	269 48 15.23	Lloyd.....	4.4351099	27,233.91	89,349.9
Jacksonville south base, 1919.....	31 54 06.416	243 02 43.04	63 07 19.94	Rusk.....	4.2083743	16,194.75	53,132.3
	95 15 04.536	307 19 30.20	127 23 29.81	Lloyd.....	4.3769606	23,821.03	78,152.8
		345 55 39.24	165 57 22.03	Smith.....	4.1881466	15,422.21	50,597.7
		124 32 04.71	304 28 41.79	Rusk.....	4.1764610	15,012.78	49,254.4
				Crockett.....	4.3246298	21,116.88	69,281.0
Jacksonville north base, 1919.....	31 58 53.959	277 04 14.51	97 09 17.56	Lloyd.....	4.0873951	12,229.12	40,121.7
	95 15 53.323	323 38 15.27	143 42 40.94	Smith.....	4.1802138	15,143.07	49,681.9
		351 45 49.24	171 46 15.06	Rusk.....	4.3483027	22,299.89	73,162.2
		77 39 06.52	257 36 09.21	Jacksonville south base.....	3.9517613	8,948.729	29,359.29
				Lloyd.....	3.9543044	9,001.28	29,531.7
Jacksonville Laplace, 1919.....	31 57 54.619	219 11 52.51	39 12 22.57	Jacksonville north base.....	3.3726516	2,358.59	7,738.1
	95 16 50.101	270 07 04.63	90 12 37.66	Smith.....	4.2179795	16,518.84	54,195.6
		338 27 45.01	158 28 40.85	Jacksonville south base.....	3.8782915	7,555.99	24,789.9
Salem, 1919.....	31 58 51.905	42 24 15.76	222 18 47.48	Rusk.....	4.3843154	24,227.88	79,487.6
	94 57 09.379	82 54 38.07	262 49 45.97	Smith.....	4.1642641	14,597.02	47,890.4
Cushing, 1919.....	31 46 38.013	98 46 00.58	278 35 43.84	Rusk.....	4.4934062	31,146.28	102,185.8
	94 48 00.169	125 46 47.78	305 37 06.52	Smith.....	4.5518378	35,631.80	116,902.0
		147 28 41.12	327 23 51.06	Salem.....	4.4284580	26,819.95	87,991.8
Enterprise, 1919.....	31 56 19.832	31 07 02.32	211 03 25.40	Cushing.....	4.3206735	20,925.39	68,652.7
	94 41 09.175	100 35 37.93	280 27 09.67	Salem.....	4.4090258	25,646.36	84,141.4
Appleby, 1919.....	31 42 32.488	108 14 40.40	288 07 00.15	Cushing.....	4.3844668	24,236.33	79,515.4
	94 33 25.359	154 27 16.50	334 23 11.91	Enterprise.....	4.4510364	28,251.17	92,867.4
Timpson, 1919.....	31 50 37.926	45 41 05.79	225 35 59.77	Appleby.....	4.3301210	21,385.58	70,162.5
	94 23 44.240	111 03 28.81	290 54 16.75	Enterprise.....	4.4685012	29,410.42	96,490.7
Baker, 1919.....	31 50 06.288	55 08 02.37	235 01 21.83	Appleby.....	4.3876218	24,413.03	80,095.1
	94 20 44.639	101 41 24.30	281 39 49.56	Timpson.....	3.6832526	4,822.28	15,821.1
		109 45 52.73	289 35 05.87	Enterprise.....	4.5337351	34,177.10	112,129.4
Holt, 1919.....	31 36 17.149	134 23 16.28	314 19 20.75	Appleby.....	4.2184213	16,535.65	54,250.7
	94 25 56.587	187 22 39.06	7 29 48.67	Timpson.....	4.4271536	26,739.52	87,727.9
		197 48 23.74	17 51 07.74	Baker.....	4.4285205	26,823.81	88,004.4

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Covington, 1919	31 43 36.194	51 56 26.26	231 50 42.69	Holt	4.3406703	21,911.41	71,887.7
	94 15 02.110	143 08 53.06	323 05 52.65	Baker	4.1766111	15,017.97	49,271.5
Neuville, 1919	31 41 11.563	74 41 07.13	254 30 11.88	Holt	4.5331830	34,133.67	111,986.9
	94 05 07.694	105 55 46.79	285 50 34.38	Covington	4.2114847	16,273.64	53,391.1
Doggett, 1919	31 57 00.299	5 01 16.94	185 00 25.55	Baker	4.4720355	29,650.74	97,279.1
	94 03 30.211	36 21 04.85	216 14 59.86	Neuville	4.4775100	29,333.31	96,237.7
Hunter (La.), 1919	31 55 18.390	40 14 43.18	220 07 21.83	Covington	4.4875712	30,730.61	100,822.0
	93 51 10.238	99 13 40.19	279 07 08.77	Baker	4.4775100	30,026.87	98,513.2
Lula (La.), 1919	31 50 33.025	56 16 34.62	236 07 57.78	Neuville	4.5332641	34,140.05	112,007.8
	93 48 45.910	117 14 12.14	297 06 24.89	Doggett	4.2942148	19,688.60	64,595.0
Supplementary points							
Hamilton, oil derrick, 1919	31 26 55.636	185 35 09.9	5 36 00.2	Neuville	4.4926118	31,089.36	101,999.0
	97 54 24.607	269 01 40.9	89 08 46.0	Doggett	4.4169799	26,120.40	85,696.7
German Baptist Church, 1919 ¹	31 25 01.26	348 24 42.7	168 25 07.6	Hunter	3.9810451	9,572.93	31,407.2
	97 52 30.10	33 37 05	213 36 30	Scoggins	4.415315	26,020.5	85,369
Farquhar's windmill, 1919	31 37 58.364	128 17 07.0	308 14 48.5	Rainer	4.332755	21,515.7	70,589
	97 48 24.481	169 08 55.6	349 06 55.2	King	3.799229	6,298.4	20,664
Coryell, German Church, 1919	31 33 01.715	258 08 34	78 14 39	Rainer	4.276287	18,892.4	61,983
	97 36 06.184	33 37 05	213 36 30	King	3.502275	3,178.9	10,429
Coryell, church, 1919 ¹	31 37 58.364	128 17 07.0	308 14 48.5	Scoggins	3.947301	8,857.3	29,059
	97 48 24.481	169 08 55.6	349 06 55.2	Pancake	2.148854	140.9	462
Coryell, smokestack, 1919 ¹	31 31 51.03	272 29 35.3	92 34 31.1	Myers	4.172396	14,872.9	48,796
	97 36 43.49	151 31 46.3	331 30 14.9	Myers	3.984368	9,646.5	31,649
Oglesby, Farmers Union, gin stack, 1919	31 25 04.096	241 38 05.1	61 41 31.2	Simpson	4.071629	11,793.1	38,691
	97 30 20.744	329 54 28.9	149 56 47.9	Oglesby	4.146718	14,019.0	45,994
Oglesby, Industrial Cotton Oil Co., gin stack, 1919	31 32 49.69	160 05 59	340 04 55	Myers	3.973670	9,411.7	30,878
	97 36 59.11	324 22 20	144 25 06	Oglesby	4.160346	14,465.9	47,460
McGregor, water tank (near old artesian wells), 1919	31 31 51.03	161 15 35	341 14 23	Myers	4.051268	11,253.0	36,919
	97 36 43.49	235 35 35	55 39 21	Simpson	4.138926	13,769.7	45,176
Oglesby, Farmers Union, gin stack, 1919	31 25 04.096	102 51 25.6	282 45 57.5	Rainer	4.231413	17,037.8	55,898
	97 30 20.744	140 55 49.8	320 55 08.4	Oglesby	3.521232	3,320.7	10,895
Oglesby, Industrial Cotton Oil Co., gin stack, 1919	31 25 04.455	183 34 51.0	3 35 16.1	Simpson	4.306508	20,347.4	66,756
	97 30 28.282	102 58 12.0	282 52 47.9	Rainer	4.226375	16,841.3	55,253
McGregor, water tank (near old artesian wells), 1919	31 26 09.073	143 34 52.1	323 34 14.7	Oglesby	3.503800	3,190.1	10,466
	97 24 35.315	184 08 28.0	4 08 57.1	Simpson	4.308558	20,349.7	66,764
McGregor, tank (in group of stacks), 1919	31 26 09.073	92 58 28.9	272 54 47.3	Oglesby	4.050368	11,229.7	36,843
	97 24 35.315	197 15 19.3	17 17 55.8	Payne	4.424340	26,566.8	87,161
Old fairgrounds pavilion, 1919	31 26 21.621	257 42 46.5	77 47 54.6	Barcus	4.202894	15,954.5	52,344
	97 24 11.268	90 57 09.9	270 53 15.8	Oglesby	4.073761	11,851.2	38,882
Moody, schoolhouse cupola, 1919 ¹	31 28 08.414	196 10 32.2	16 12 56.2	Payne	4.415209	26,014.1	85,348
	97 24 49.429	258 37 37.5	78 42 33.1	Barcus	4.183377	15,253.8	50,045
Moody, water tank, 1919 ¹	31 28 08.414	74 04 36.6	254 01 02.3	Oglesby	4.052094	11,274.4	36,989
	97 24 49.429	200 49 30.2	20 52 14.2	Payne	4.365720	23,212.4	76,156
Delmore ranch, tall white silo, 1919 ¹	31 18 52.16	271 00 13.3	91 05 28.9	Barcus	4.203145	15,964.1	52,376
	97 21 35.97	131 21 55	311 16 40	Oglesby	4.327414	21,252.7	69,727
Delmore ranch, low silo, 1919 ¹	31 18 27.74	212 47 46	32 51 20	Barcus	4.301889	20,039.6	65,747
	97 21 26.52	132 24 33	312 19 13	Oglesby	4.341250	21,940.7	71,984
China Spring, church, 1919 ¹	31 37 47.31	211 04 33	31 08 03	Barcus	4.312719	20,545.6	67,407
	97 23 34.03	71 19 35	251 16 27	Simpson	3.998957	9,976.0	32,730
China Spring, steel smokestack, 1919 ¹	31 37 47.60	238 19 51	58 21 56	Payne	3.867015	7,362.3	24,154
	97 23 34.20	71 16 13	251 13 05	Simpson	3.998894	9,974.6	32,725
Hewitt, steel smokestack, 1919 ¹	31 39 00.43	238 24 27	58 26 32	Payne	3.866999	7,361.5	24,152
	97 18 37.53	136 12 34	316 12 04	West	3.348760	2,232.3	7,324
Waco, Camp MacArthur, tall wooden tank, near, 1919	31 39 06.04	232 27 59	52 34 34	West	4.396176	24,898.7	81,688
	97 17 56.27	118 39 56	298 39 04	Payne	3.477043	2,999.5	9,841
Barcus, church east of, 1919	31 28 17.065	231 12 55	51 19 08	West	4.379069	23,937.0	78,533
	97 14 05.288	61 51 13.3	241 50 52.7	Barcus	3.073083	1,183.3	3,882
Hewitt, steel smokestack, 1919 ¹	31 27 45.90	157 51 56.4	337 49 03.2	Payne	4.364267	23,134.9	75,902
	97 11 48.26	252 13 38.6	72 24 21.8	Battle	4.532402	34,072.3	111,786
Waco, Camp MacArthur, tall wooden tank, near, 1919	31 33 32.346	94 56 05	274 54 33	Barcus	3.670085	4,678.3	15,349
	97 10 35.385	32 40 31.3	68 40 22	Battle	4.491162	30,985.8	101,659
Waco, Camp MacArthur, tall wooden tank, near, 1919	31 33 32.346	32 40 31.3	212 38 20.9	Barcus	4.086238	12,196.6	40,015
	97 10 35.385	129 27 25.1	309 22 41.6	Payne	4.266029	18,451.4	60,536
Waco, Camp MacArthur, tall wooden tank, near, 1919	31 33 32.346	195 36 58.9	15 39 19.8	West	4.418719	26,225.2	86,041
	97 10 35.385	129 27 25.1	309 22 41.6	Payne	4.266029	18,451.4	60,536

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Waco, Camp MacArthur, tall steel tank, near, 1919.	31 32 34.574	35 05 36.6	215 03 38.5	Barcus.....	4.015910	10,373.1	34,032
	97 10 58.909	134 44 29.8	314 39 58.7	Payne.....	4.282954	19,184.7	62,942
		195 51 17.3	15 53 50.5	West.....	4.448800	28,106.1	92,211
Waco, steel tank, white top, 1919 ¹	31 32 57.70	36 09 25	216 07 12	Barcus.....	4.056658	11,393.5	37,380
	97 10 30.18	131 39 03	311 34 17	Payne.....	4.284424	19,249.7	63,155
Waco, Raleigh Hotel, flagstaff, 1919 ¹	31 33 14.68	47 21 46	227 18 17	Barcus.....	4.156807	14,348.5	47,075
	97 08 04.97	186 51 25	6 52 26	West.....	4.414724	25,985.1	85,253
Waco, Amicable Building, flagpole, 1919.....	31 33 24.396	47 17 53.8	227 14 18.9	Barcus.....	4.169432	14,771.8	48,464
	97 07 53.602	122 54 30.0	302 48 21.8	Payne.....	4.343326	22,045.8	72,329
		186 16 24.5	6 17 20.5	West.....	4.409148	25,653.6	84,165
West, white church, 1919 ¹	31 48 25.46	17 36 26	197 36 12	West.....	3.373538	2,363.4	7,754
	97 05 39.88	54 24 30	234 17 10	Payne.....	4.432847	27,092.4	88,986
Waco, Amicable Building, elevator shaft, center, 1919.	31 33 24.803	47 14 47.3	227 11 12.5	Barcus.....	4.169550	14,775.8	48,477
	97 07 53.832	122 53 22.4	302 47 14.3	Payne.....	4.343091	22,033.9	72,290
		186 17 24.2	6 18 20.3	West.....	4.408948	25,641.8	84,126
Waco, power plant, tall brick stack, 1919.....	31 33 34.912	48 57 35.9	228 53 40.7	Barcus.....	4.197258	15,749.2	51,670
	97 07 14.844	120 49 45.8	300 43 17.2	Payne.....	4.356848	22,743.0	74,616
		184 03 08.6	4 03 44.2	West.....	4.402071	25,238.9	82,805
Lakeview, oil or well derrick, near, 1919.....	31 38 21.455	98 15 39.7	278 09 11.4	Payne.....	4.294399	19,697.0	64,623
	97 07 16.240	186 21 09.2	6 21 45.6	West.....	4.216209	16,451.6	53,975
		290 50 02.6	110 57 13.0	Battle.....	4.365005	23,174.2	76,031
Lakeview, standpipe, 1919.....	31 38 17.736	98 04 22.9	277 57 29.0	Payne.....	4.321934	20,986.2	68,852
	97 06 27.437	181 51 56.5	1 52 07.2	West.....	4.216793	16,473.8	54,048
		291 45 23.1	111 52 08.0	Battle.....	4.341124	21,934.3	71,963
West, tall red church spire, 1919.....	31 48 01.230	14 16 14.5	194 16 06.8	West.....	3.191525	1,554.3	5,099
	97 05 52.488	55 18 18.4	235 11 05.1	Payne.....	4.421463	26,391.4	86,586
		294 03 51.9	114 11 17.0	Wilie.....	4.387184	24,388.4	80,014
West, standpipe, 1919.....	31 48 04.404	25 47 35.8	205 47 20.3	West.....	3.250796	1,781.5	5,845
	97 05 37.585	55 36 46.1	235 29 25.0	Payne.....	4.427645	26,769.8	87,827
		294 39 34.3	114 46 51.6	Wilie.....	4.381506	24,071.7	78,975
West, tank on top of brick cotton mill, 1919.....	31 48 02.823	35 11 43.7	215 11 21.7	West.....	3.279500	1,903.3	6,244
	97 05 25.356	56 05 07.0	235 57 39.5	Payne.....	4.431503	27,008.7	88,611
		294 52 42.1	114 59 52.9	Wilie.....	4.375831	23,759.2	77,950
Axtell, low smokestack no. 1, 1919.....	31 37 05.246	139 36 13.7	319 30 55.7	West.....	4.390355	24,567.2	80,601
	96 56 01.894	213 16 25.2	33 18 39.1	Wilie.....	4.087951	12,244.8	40,173
		326 46 40.5	146 47 57.5	Battle.....	3.849601	7,073.0	23,205
Axtell, smokestack no. 2, 1919.....	31 39 25.375	138 28 31.3	318 24 16.7	West.....	4.283759	19,220.2	63,058
	96 58 02.738	239 06 13.4	59 09 30.8	Wilie.....	4.062092	11,537.0	37,851
		325 23 03.9	145 25 24.3	Battle.....	4.094531	12,431.7	40,786
Axtell, smokestack no. 3, 1919.....	31 39 35.833	137 49 35.8	317 45 21.1	West.....	4.278332	18,981.6	62,275
	96 58 02.667	240 29 29.2	60 32 46.6	Wilie.....	4.055887	11,373.3	37,314
		326 13 01.6	146 15 21.9	Battle.....	4.103704	12,697.1	41,657
Mart, water tank, 1919.....	31 32 22.770	117 34 21.9	297 32 36.1	Battle.....	3.779151	6,013.8	19,730
	96 50 12.813	172 33 26.0	352 32 36.8	Wilie.....	4.280949	19,096.3	62,652
		266 07 50.9	86 13 42.6	Horn.....	4.249708	17,770.8	58,303
Penelope, church, tall white spire, 1919 ¹	31 51 32.32	295 28 50	115 32 15	Hubbard.....	4.055268	11,357.1	37,261
	96 55 51.28	63 43 58	243 38 33	West.....	4.256860	18,065.9	59,271
Penelope, red-brick building, round dome, 1919. ¹	31 51 40.89	296 48 11	116 51 35	Hubbard.....	4.057690	11,420.6	37,469
	96 55 49.04	63 04 16	242 58 50	West.....	4.260945	18,236.6	59,831
Penelope, oil or well derrick, 1919 ¹	31 51 37.50	297 21 23	117 24 39	Hubbard.....	4.040623	10,980.5	36,025
	96 55 32.27	63 58 35	243 53 00	West.....	4.269156	18,584.7	60,973
Hubbard, standpipe, 1919.....	31 50 53.966	297 36 39.6	117 44 27.0	Tehuacana.....	4.420791	26,350.6	86,452
	96 47 43.147	22 45 46.9	202 43 38.6	Wilie.....	4.219539	16,578.3	54,391
		34 53 04.0	214 52 12.2	Hubbard.....	3.655313	4,521.8	14,835
Hubbard, tall square dome, 1919.....	31 50 55.791	298 13 34.0	118 21 11.5	Tehuacana.....	4.414024	25,943.2	85,115
	96 47 24.480	24 13 58.7	204 11 40.5	Wilie.....	4.225968	16,825.5	55,202
		39 15 22.4	219 14 20.7	Hubbard.....	3.686881	4,862.7	15,954
Prairie Hill, church spire, 1919.....	31 39 14.540	133 52 29.0	313 50 19.2	Wilie.....	3.955447	9,025.0	29,610
	96 47 39.682	171 27 42.6	351 26 49.1	Hubbard.....	4.256060	18,032.7	59,162
		248 08 37.7	68 16 22.0	Tehuacana.....	4.398976	25,059.7	82,217
Cooledge, standpipe, 1919.....	31 45 16.646	76 24 53.2	256 18 09.8	Wilie.....	4.317541	20,775.0	68,159
	96 38 59.833	112 15 41.7	292 10 14.3	Hubbard.....	4.247157	17,666.8	57,962
		280 54 30.4	100 57 41.8	Tehuacana.....	3.989032	9,750.6	31,990
Dawson, standpipe, 1919 ¹	31 53 59.14	317 58 11	138 03 35	Tehuacana.....	4.382707	24,138.3	79,194
	96 43 10.06	46 04 36	226 01 20	Hubbard.....	4.132341	13,562.5	44,496
Tehuacana latitude and longitude station, 1919. ¹							
	31 44 16.43						
	96 32 56.12						

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Wortham, standpipe, 1919 ¹	31 47 26.06	302 08 53	122 13 02	Kirvin.....	4.167381	14,702.2	48,235
	96 27 34.95	55 23 59	235 21 10	Tehuacana.....	4.011581	10,270.3	33,695
Groesbeck, courthouse, finial, 1919.....	31 31 21.938	105 43 48.9	285 40 13.2	Horn.....	4.053040	11,299.0	37,070
	96 32 08.258	176 58 41.8	356 58 16.7	Tehuacana.....	4.378251	23,891.9	78,385
		247 52 44.1	67 57 13.2	Fallon.....	4.165529	14,639.6	48,030
Groesbeck, standpipe, 1919.....	31 31 34.323	104 29 56.6	284 26 30.9	Horn.....	4.029780	10,709.8	35,137
	96 32 27.486	178 09 43.9	358 09 28.9	Tehuacana.....	4.370870	23,489.3	77,064
		249 57 33.4	70 02 12.5	Fallon.....	4.175391	14,975.8	49,133
Mexia, standpipe, 1919.....	31 41 09.417	325 46 53.4	145 49 43.6	Fallon.....	4.182444	15,221.0	49,938
	96 28 58.553	46 35 08.5	226 29 52.9	Horn.....	4.339658	21,860.4	71,720
		132 41 00.2	312 38 55.3	Tehuacana.....	3.929739	8,506.3	27,908
Mexia, Mungers compress, 1919.....	31 40 35.795	138 25 41.6	318 23 41.1	Tehuacana.....	3.958673	9,092.3	29,830
	96 29 06.903	252 03 12.7	72 08 09.4	Kirvin.....	4.193943	15,629.4	51,277
		322 45 39.9	142 48 34.5	Fallon.....	4.161625	14,508.6	47,600
Mexia, Mungers tank, 1919.....	31 40 43.700	137 40 28.4	317 38 29.2	Tehuacana.....	3.947977	8,871.1	29,105
	96 29 09.182	252 58 15.5	73 03 13.5	Kirvin.....	4.193501	15,613.5	51,225
		323 08 51.4	143 11 47.3	Fallon.....	4.168470	14,739.1	48,357
Mexia, high school, dome, 1919 ¹	31 41 10.21	255 25 16	75 30 04	Kirvin.....	4.173751	14,919.4	48,948
	96 28 50.57	326 29 35	146 32 21	Fallon.....	4.179669	15,124.1	49,620
Mexia, Methodist Church, round dome, 1919.....	31 40 53.430	133 22 46.2	313 20 34.0	Tehuacana.....	3.959686	9,113.5	29,900
	96 28 44.466	253 20 35.7	73 25 20.7	Kirvin.....	4.173291	14,903.6	48,896
		325 54 03.5	145 56 46.5	Fallon.....	4.164508	14,605.2	47,917
Mexia, First Presbyterian Church, spire, 1919.....	31 40 58.660	134 13 27.0	314 11 21.8	Tehuacana.....	3.941670	8,743.2	28,685
	96 28 58.080	254 18 37.5	74 23 29.6	Kirvin.....	4.181933	15,203.1	49,879
		325 06 24.1	145 09 14.1	Fallon.....	4.174382	14,941.1	49,019
Mexia, Central Presbyterian Church, spire, 1919.....	31 41 01.506	132 47 42.6	312 45 32.9	Tehuacana.....	3.946803	8,847.1	29,026
	96 28 49.478	254 24 01.0	74 28 48.6	Kirvin.....	4.174970	14,961.3	49,086
		326 00 58.5	146 03 44.0	Fallon.....	4.172757	14,885.3	48,836
Tehuacana, small white wooden tank, 1919.....	31 44 31.312	276 41 52.1	96 48 45.1	Kirvin.....	4.318414	20,816.8	68,296
	96 32 47.419	322 10 26.6	142 15 17.1	Fallon.....	4.376547	23,798.4	78,079
		26 45 38.0	206 45 33.1	Tehuacana.....	2.705644	507.7	1,666
Tehuacana, Westminster College, 1919.....	31 44 38.040	27 16 54.1	207 16 47.4	Tehuacana.....	2.871143	743.3	2,439
	96 32 43.162	83 03 26.5	262 53 25.1	Wille.....	4.481932	30,334.2	99,521
		106 44 59.5	286 36 13.8	Hubbard.....	4.438071	27,420.2	89,961
Simsboro, gin, tall smokestack, 1919.....	31 40 28.306	107 36 04.4	287 28 40.4	Tehuacana.....	4.367928	23,330.7	76,544
	96 18 51.273	165 06 20.9	345 05 54.2	Kirvin.....	3.716921	5,211.0	17,096
		307 38 48.0	127 41 05.9	Teague.....	3.941821	8,746.2	28,695
Boggy Prairie, oil derrick, 1919.....	31 33 44.592	157 31 56.2	337 29 32.2	Kirvin.....	4.276635	18,907.5	62,032
	96 15 07.697	188 17 22.8	8 17 43.3	Teague.....	3.855184	7,164.5	23,506
		253 27 01.4	73 31 43.6	Burleson.....	4.170850	14,820.1	48,622
Teague, high school, dome with flagstaff, 1919.....	31 37 44.802	59 58 07.8	239 54 31.8	Fallon.....	4.098728	12,552.4	41,182
	96 16 41.843	154 45 59.4	334 44 24.7	Kirvin.....	4.046700	11,135.3	36,533
		275 00 35.7	95 01 45.6	Teague.....	3.547482	3,527.6	11,573
Teague, tall water tank, 1919.....	31 37 52.831	58 10 27.1	238 06 58.0	Fallon.....	4.092807	12,382.5	40,625
	96 16 54.983	115 05 55.6	294 57 30.7	Tehuacana.....	4.446188	27,937.5	91,658
		155 52 14.3	335 50 46.5	Kirvin.....	4.032053	10,766.0	35,321
Teague, low water tank at railroad shops, 1919.....	31 37 45.957	57 43 06.4	237 39 47.6	Fallon.....	4.073011	11,830.7	38,815
	96 17 14.655	158 50 55.4	338 49 37.9	Kirvin.....	4.031885	10,761.8	35,308
		274 28 57.4	94 30 24.5	Teague.....	3.642692	4,392.3	14,410
Palestine, flat-topped tank, 1919 ¹	31 45 40.95	308 23 12	128 26 23	Camp.....	4.085169	12,166.6	39,917
	95 38 16.28	57 16 06	237 08 18	Lee.....	4.445519	27,894.5	91,517
Palestine, courthouse statue, 1919 ¹	31 45 53.13	313 20 20	133 23 08	Camp.....	4.062815	11,556.2	37,914
	95 37 33.31	57 51 29	237 43 18	Lee.....	4.463149	29,050.2	95,309
Rusk, asylum standpipe, 1919 ¹	31 48 23.29	246 48 10	66 49 18	Rusk.....	3.568748	3,704.7	12,155
	95 09 40.08	18 58 06	198 56 58	Crockett.....	4.020559	10,484.8	34,399
Jacksonville latitude and longitude station, 1919. ¹	31 57 54.92						
Jacksonville, First National Bank building, flagstaff, 1919.....	95 16 50.10						
	31 57 48.316	90 41 02.5	270 38 19.9	Lloyd.....	3.906797	8,068.6	26,472
	95 16 20.935	199 43 27.5	19 43 42.1	Jacksonville north base.....	3.332017	2,147.9	7,047
		343 37 50.7	163 38 31.1	Jacksonville south base.....	3.852674	7,123.2	23,370
Jacksonville, Methodist Church, center of dome, 1919.....	31 57 38.888	92 46 14.7	272 43 33.7	Lloyd.....	3.903004	7,998.4	26,241
	95 16 23.941	199 10 08.9	19 10 25.1	Jacksonville north base.....	3.388814	2,448.0	8,031
		342 18 56.8	162 19 38.8	Jacksonville south base.....	3.836869	6,868.6	22,535
Jacksonville, Baptist University, cupola, 1919.....	31 57 56.387	88 47 53.7	268 45 26.8	Lloyd.....	3.862595	7,287.8	23,910
	95 16 50.708	220 20 58.2	40 21 28.6	Jacksonville north base.....	3.366787	2,326.9	7,634
		338 30 03.9	158 31 00.1	Jacksonville south base.....	3.881526	7,612.5	24,975

¹ No check on this position.

Waco-Mansfield arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Jacksonville, Methodist College, north cupola, 1919.	31 57 17.726	162 39 30.5	342 39 23.3	Jacksonville Laplace.....	3.075718	1,190.5	3,906
	95 16 36.588	200 58 00.5	20 58 23.4	Jacksonville north base.....	3.501649	3,174.3	10,414
		337 40 52.7	157 41 41.3	Jacksonville south base.....	3.804092	6,369.3	20,897
Jacksonville, Methodist College, south cupola, 1919.	31 57 17.087	162 56 03.8	342 55 56.7	Jacksonville Laplace.....	3.082521	1,209.3	3,968
	95 16 36.586	200 50 23.5	20 50 46.5	Jacksonville north base.....	3.504153	3,192.7	10,475
		337 36 51.2	157 37 39.9	Jacksonville south base.....	3.802849	6,351.1	20,837
Jacksonville, city water tank, 1919.....	31 57 43.927	343 16 53.1	163 17 33.6	Jacksonville south base.....	3.844784	6,994.9	22,949
	95 16 21.115	113 23 59.0	293 23 43.7	Jacksonville Laplace.....	2.918724	829.3	2,721
		198 41 18.7	18 41 33.5	Jacksonville north base.....	3.357390	2,277.1	7,471
Jacksonville, ice plant smokestack, 1919 ¹	31 57 47.09	210 18 32	30 18 57	Jacksonville north base.....	3.377652	2,385.9	7,828
	95 16 39.19	339 54 02	159 54 52	Jacksonville south base.....	3.859574	7,237.3	23,744
Sacul, church, 1919 ¹	31 49 37.33	87 38 08	267 31 38	Rusk.....	4.289524	19,477.1	63,901
	94 55 10.66	169 39 33	349 38 30	Salem.....	4.239639	17,363.6	56,967
Sacul, schoolhouse cupola, 1919 ¹	31 49 44.90	86 55 23	266 48 57	Rusk.....	4.285967	19,318.2	63,380
	94 55 17.13	170 04 43	350 03 44	Salem.....	4.233102	17,104.2	56,116
Timpson, tank, 1919 ¹	31 54 16.07	327 00 05	147 01 45	Baker.....	3.962538	9,173.6	30,097
	94 23 54.64	357 40 13	177 40 18	Timpson.....	3.827659	6,724.5	22,062
Timpson, church, 1919 ¹	31 54 11.09	326 21 51	146 23 32	Baker.....	3.956958	9,056.4	29,713
	94 23 55.41	357 26 18	177 26 23	Timpson.....	3.817695	6,572.0	21,562
Tenaha, white church spire, 1919 ¹	31 56 39.45	38 51 48	218 48 32	Baker.....	4.191678	15,548.1	51,011
	94 14 33.63	52 27 36	232 22 45	Timpson.....	4.261453	18,258.0	59,901
Center, tank, 1919.....	31 47 40.975	40 56 59.2	220 54 48.5	Covington.....	3.999094	9,979.2	32,740
	94 10 53.676	106 06 06.4	286 00 54.9	Baker.....	4.208822	16,174.2	53,065
		214 03 03.1	34 06 57.3	Doggett.....	4.318070	20,800.3	68,242
Haslam, standpipe, 1919 ¹	31 57 51.46	286 07 43	106 13 11	Hunter.....	4.228547	16,925.7	55,530
	94 01 29.15	63 38 23	243 37 19	Doggett.....	3.550011	3,548.2	11,641
Oil derrick, south of Logansport (La.), 1918 ¹ ..	31 57 49.14	294 06 57	114 10 26	Hunter.....	4.055032	11,350.9	37,240
	93 57 44.60	80 36 54	260 33 52	Doggett.....	3.963783	9,199.9	30,183

Ninety-fourth meridian arc

Principal points	°	'	"	°	'	"	°	'	"			
Foreman (Ark.), 1930.....	33	40	22.092									
	94	20	27.621									
Hawkins (Ark.), 1930.....	33	39	43.250	94	28	18.27	274	22	45.54	Foreman.....	4. 19.5718	15, 508. 57
	94	10	27.435									50, 881. 0
Holland, 1930.....	33	27	39.030	135	31	49.96	315	23	34.03	Foreman.....	4. 5182929	32, 983. 21
	94	05	30.696	161	05	20.97	341	02	36.92	Hawkins.....	4. 3727181	23, 589. 47
Ashdown northwest base (Ark.), 1930.....	33	41	17.002	348	48	23.08	168	50	09.88	Holland.....	4. 4097472	25, 689. 00
	94	08	43.805	42	45	09.12	222	44	11.66	Hawkins.....	3. 5947388	3, 933. 13
Ashdown southeast base (Ark.), 1930.....	33	35	08.656	17	43	02.21	197	41	27.57	Holland.....	4. 1626218	14, 541. 92
	94	02	39.328	125	04	20.82	305	00	01.61	Hawkins.....	4. 1683821	14, 736. 08
				140	24	47.27	320	21	25.37	Ashdown northwest base.....	4. 1682478	14, 731. 529
Hooks, 1930.....	33	27	07.840	170	05	58.66	350	04	27.00	Foreman.....	4. 3951643	24, 840. 73
	94	17	41.828	205	40	33.99	25	44	34.11	Hawkins.....	4. 4121278	25, 830. 20
				267	02	00.40	87	08	43.48	Holland.....	4. 2766012	18, 906. 07
Alamo, 1930.....	33	15	23.530	138	30	31.29	318	23	42.38	Hooks.....	4. 4622878	28, 992. 64
	94	05	18.106	179	10	40.37	359	10	33.45	Holland.....	4. 3552682	22, 660. 43
Antioch, 1930.....	33	11	14.477	172	29	57.32	352	28	35.06	Hooks.....	4. 4716576	29, 624. 95
	94	15	12.091	206	19	37.68	26	24	57.08	Holland.....	4. 5296064	33, 853. 72
				243	26	35.43	63	32	00.86	Alamo.....	4. 2352372	17, 188. 47
Bloomburg, 1930.....	33	09	02.694	102	06	17.72	281	59	36.12	Antioch.....	4. 2888738	19, 447. 95
	94	02	58.036	162	49	41.74	342	48	25.04	Alamo.....	4. 0892142	12, 280. 45
Bivins, 1930.....	33	02	01.143	167	04	27.60	347	03	05.11	Antioch.....	4. 2427947	17, 490. 20
	94	12	41.064	204	52	41.12	24	56	43.32	Alamo.....	4. 4354404	27, 254. 64
				229	17	45.19	49	23	03.52	Bloomburg.....	4. 2995308	19, 931. 08
Pinkard, 1930.....	32	59	26.570	122	51	16.54	302	48	41.65	Bivins.....	3. 9436129	8, 782. 39
	94	07	56.761	203	33	46.19	23	36	29.20	Bloomburg.....	4. 2870390	19, 365. 96
Ravana (Ark.), 1930.....	33	04	05.167	47	32	16.01	227	28	59.21	Pinkard.....	4. 1040158	12, 706. 20
	94	01	55.715	77	11	40.50	257	05	48.54	Bivins.....	4. 2348689	17, 173. 90
				170	00	24.20	349	59	50.16	Bloomburg.....	3. 9688130	9, 307. 07
Posey, 1930.....	32	56	13.362	128	43	40.29	308	41	04.67	Pinkard.....	3. 9785462	9, 518. 01
	94	03	10.762	187	37	42.86	7	38	23.74	Ravana.....	4. 1662625	14, 664. 34

1 No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Principal points—Continued								
Pearman (La.), 1930.....	33 00 34.246 93 57 09.190	49 27 54.82 82 58 45.83 131 10 23.85	229 24 38.03 262 52 53.13 311 07 47.63	Posey..... Pinkard..... Ravana.....	4.0919832 4.2289020 3.9944948	12,359.00 16,939.55 9,874.04	40,547.8 55,575.8 32,395.1	
Iyra (La.), 1930.....	32 55 37.745 93 53 55.550	94 23 30.83 151 10 47.21	274 18 28.99 331 09 01.84	Posey..... Spearman.....	4.1603449 4.0181467	14,465.88 10,426.70	47,460.1 34,208.3	
ivian (La.), 1930.....	32 53 54.397 93 59 11.204	124 32 08.68 194 25 08.42 248 45 46.23	304 29 58.49 14 26 14.79 68 48 37.74	Posey..... Spearman..... Myra.....	3.8782122 4.1044445 3.9444113	7,554.61 12,718.75 8,798.55	24,785.4 41,728.1 28,866.6	
yson (La.), 1930.....	32 48 37.915 93 53 19.218	136 50 05.76 175 49 31.68	316 46 54.80 355 49 11.96	Vivian..... Myra.....	4.1262026 4.1128525	13,372.19 12,967.39	43,871.9 42,543.8	
ewis (La.), 1930.....	32 48 43.467 93 59 38.241	184 11 44.64 214 53 36.54 270 57 54.40	4 11 59.31 34 56 42.53 91 01 19.79	Vivian..... Myra..... Tyson.....	3.9824523 4.1921239 3.9939532	9,604.00 15,564.10 9,861.73	31,509.1 51,063.2 32,354.7	
il (La.), 1930.....	32 44 29.503 93 59 00.956	172 55 56.29 229 15 55.33	352 55 36.10 49 19 00.33	Lewis..... Tyson.....	3.8967048 4.0693986	7,883.24 11,732.72	25,863.6 38,493.1	
elcher (La.), 1930.....	32 44 31.546 93 50 04.979	89 46 54.66 117 31 29.65 146 20 52.63	269 42 04.77 297 26 19.30 326 19 07.48	Oil..... Lewis..... Tyson.....	4.1447098 4.2257408 3.9599361	13,954.36 16,816.70 9,118.77	45,781.9 55,172.8 29,917.2	
Moor (La.), 1930.....	32 38 18.128 93 58 54.860	179 12 18.67 230 09 16.81	359 12 15.38 50 14 03.00	Oil..... Belcher.....	4.0584661 4.2545015	11,441.06 17,968.07	37,536.2 58,950.2	
Roy (La.), 1930.....	32 35 18.684 93 51 30.569	115 32 34.86 145 21 47.94 187 27 15.65	295 28 35.40 325 17 44.85 7 28 01.85	Moor..... Oil..... Belcher.....	4.1083954 4.3145155 4.2349190	12,834.99 20,630.77 17,175.88	42,109.5 67,686.1 56,351.2	
Bryson (La.), 1930.....	32 33 38.851 93 58 37.370	176 57 59.91 254 31 33.40	356 57 50.49 74 35 23.19	Moor..... Roy.....	3.9352492 4.0625616	8,614.88 11,549.46	28,264.0 37,891.9	
Greenwood (La.), 1930.....	32 26 23.336 93 57 10.221	170 22 53.60 172 56 19.36 208 14 13.28	350 22 06.78 352 55 23.08 28 17 15.85	Bryson..... Moor..... Roy.....	4.1337589 4.3490947 4.2723639	13,606.89 22,186.80 18,722.50	44,641.9 72,791.2 61,425.4	
Reid (La.), 1930.....	32 28 17.813 93 48 01.887	76 12 30.71 120 51 05.44 157 13 47.87	256 07 36.45 300 45 23.85 337 11 55.66	Greenwood..... Bryson..... Roy.....	4.1687657 4.2857988 4.1480377	14,749.11 19,310.73 14,061.70	48,389.4 63,355.3 46,134.1	
Spring (La.), 1930.....	32 18 59.463 93 58 05.223	185 59 56.27 222 28 16.43	6 00 25.72 42 33 39.66	Greenwood..... Reid.....	4.1382364 4.3679777	13,747.90 23,333.38	45,104.6 76,552.9	
Shreveport north base (La.), 1930.....	32 24 18.247 93 47 37.980	59 08 06.26 104 29 38.31 175 09 51.61	239 02 30.53 284 24 31.50 355 09 38.79	Spring..... Greenwood..... Reid.....	4.2813622 4.1886411 3.8695688	19,114.47 15,439.78 7,405.75	62,711.4 50,655.3 24,297.0	
Shreveport south base (La.), 1930.....	32 19 15.711 93 50 35.158	87 35 57.00 141 55 59.07 193 28 42.05 206 25 04.41	267 31 56.39 321 52 27.50 13 30 04.17 26 26 39.25	Spring..... Greenwood..... Reid..... Shreveport north base.....	4.0712625 4.2236922 4.2348217 4.0173142	11,783.18 16,737.56 17,172.03 10,406.727	38,658.6 54,913.1 56,338.6 34,142.74	
Stonewall (La.), 1930.....	32 18 09.670 93 47 03.095	95 06 33.40 110 09 11.94 133 49 06.51 175 18 52.73 175 24 32.45	275 00 39.50 290 07 18.58 313 43 41.45 355 18 21.24 355 24 13.78	Spring..... Shreveport south base..... Greenwood..... Reid..... Shreveport north base.....	4.2402769 3.7714886 4.3420367 4.2740520 4.0565126	17,389.09 5,908.65 21,980.46 18,795.42 11,389.71	57,060.7 19,385.3 72,114.2 61,664.6 37,367.7	
Forks (La.), 1930.....	32 13 36.439 93 59 06.358	189 07 50.10 245 58 36.42	9 08 22.74 66 05 02.52	Spring..... Stonewall.....	4.0033607 4.3163165	10,077.68 20,716.50	33,063.2 67,967.4	
Kickapoo (La.), 1930.....	32 11 43.100 93 50 12.451	104 03 30.40 137 23 57.32 202 35 15.05	283 58 45.81 317 19 45.00 22 36 56.09	Forks..... Spring..... Stonewall.....	4.1587059 4.2617431 4.1105130	14,411.39 18,270.19 12,897.72	47,281.4 59,941.4 42,315.3	
Pace (La.), 1930.....	32 04 48.353 94 00 17.404	186 31 27.14 231 05 47.79 320 40 22.00 19 21 17.80	6 32 04.95 51 11 09.60 140 45 11.96 199 19 35.59	Forks..... Kickapoo..... Hunter..... Doggett.....	4.2141048 4.3088103 4.3556774 4.1840885	16,372.12 20,361.53 22,681.80 15,278.77	53,714.2 66,802.8 74,415.2 50,127.1	
Ford (La.), 1930.....	32 04 50.489 93 50 09.283	89 48 30.52 139 03 25.45 179 37 33.59 5 11 33.33 55 29 33.80	269 43 07.54 318 58 39.62 359 37 31.90 185 11 01.02 235 22 29.19	Pace..... Forks..... Kickapoo..... Hunter..... Doggett.....	4.2027208 4.3316237 4.1041231 4.2478175 4.4069798	15,948.53 21,459.70 12,709.34 17,693.65 25,525.82	52,324.5 70,405.7 41,697.2 58,049.9 83,746.0	
Brittain, 1931.....	31 37 46.582 93 53 13.611	108 36 10.07 185 42 47.67 196 36 05.99	288 29 55.28 5 43 52.63 16 38 26.80	Neuville..... Hunter..... Lula.....	4.2976292 4.5126539 4.3915613	19,844.00 32,557.71 24,635.49	65,104.9 106,816.4 80,824.9	
Molly, 1931.....	31 33 58.866 94 04 26.470	175 20 32.25 248 22 41.07	355 20 10.63 68 28 33.62	Neuville..... Brittain.....	4.1261599 4.2804515	13,370.88 19,074.43	43,867.6 62,580.0	
Geneva, 1931.....	31 29 36.523 93 55 07.716	118 46 07.29 143 34 51.92 191 16 02.75	298 41 05.09 323 29 37.62 11 17 02.47	Molly..... Neuville..... Brittain.....	4.2255679 4.4251560 4.1872462	16,810.01 26,616.81 15,390.27	55,150.8 87,325.3 50,492.9	

Ninety-fourth meridian arc—Continued

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U. S. COAST AND GEODETIC SURVEY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance								
					Logarithm (meters)	Meters	Feet						
<i>Principal points—Continued</i>													
Bronson, 1931.....	31 21 23.449	163 56 44.15	343 54 31.63	Molly.....	4.3840299	24,211.96	79,435.4						
	94 00 12.566	207 54 37.26	27 57 16.31	Geneva.....	4.2352289	17,188.14	56,391.4						
Bannister, 1931.....	31 21 58.807	214 07 44.95	34 12 42.62	Molly.....	4.4281947	26,803.70	87,938.5						
	94 13 56.726	244 36 52.17	64 46 40.90	Geneva.....	4.5182674	32,981.27	108,206.0						
		272 48 08.84	92 55 17.76	Bronson.....	4.3386328	21,808.85	71,551.2						
Rosin, 1931.....	31 10 58.510	138 14 45.39	318 06 48.53	Bannister.....	4.4358431	27,279.92	89,500.9						
	94 02 29.313	190 38 07.26	10 39 18.24	Bronson.....	4.2918900	19,583.49	64,250.2						
Mott, 1931.....	31 09 11.293	196 31 07.90	16 33 25.56	Bannister.....	4.3919467	24,657.37	80,896.7						
	94 18 22.011	231 53 15.08	52 02 40.33	Bronson.....	4.5634430	36,596.79	120,068.0						
		262 28 31.72	82 36 44.78	Rosin.....	4.4056076	25,445.30	83,481.8						
Graham, 1931.....	30 59 35.357	129 28 11.79	309 21 11.55	Mott.....	4.4461775	27,936.85	91,656.1						
	94 04 47.798	189 53 11.89	9 54 23.39	Rosin.....	4.3295297	21,356.48	70,067.1						
Gregory, 1931.....	30 58 04.516	185 32 04.49	5 32 43.25	Mott.....	4.3145129	20,630.65	67,685.7						
	94 19 37.133	228 44 43.14	48 53 33.66	Rosin.....	4.5587201	36,200.96	118,769.3						
		263 10 32.62	83 18 10.40	Graham.....	4.3759128	23,763.63	77,964.5						
Town, 1931.....	30 46 58.788	161 07 31.99	341 05 16.44	Gregory.....	4.3358352	21,668.82	71,091.8						
	94 15 12.996	215 26 00.98	35 31 21.93	Graham.....	4.4565311	28,610.87	93,867.5						
Woodville, 1931.....	30 46 28.983	195 11 34.83	15 13 27.30	Gregory.....	4.3462868	22,196.62	72,823.4						
	94 23 16.328	230 29 06.50	50 38 35.51	Graham.....	4.5811949	38,123.68	125,077.4						
		265 52 50.55	85 56 57.89	Town.....	4.1100769	12,884.78	42,272.8						
Hillister eccentric, 1931.....	30 41 04.236	183 11 46.64	3 11 57.37	Woodville.....	4.0006970	10,016.06	32,861.0						
	94 23 37.329	230 49 33.96	50 53 51.70	Town.....	4.2379941	17,297.93	56,751.6						
Spurger, 1931.....	30 41 18.324	88 31 53.45	268 26 38.36	Hillister eccentric.....	4.2158610	16,438.45	53,931.8						
	94 13 19.926	121 07 48.79	301 02 44.01	Woodville.....	4.2678131	18,527.34	60,785.1						
		164 00 00.90	343 59 03.11	Town.....	4.0377227	10,907.44	35,785.5						
Swearingen, 1931.....	30 36 13.415	129 37 27.33	309 34 00.07	Hillister eccentric.....	4.1477096	14,051.08	46,099.3						
	94 16 50.710	210 51 14.05	30 53 01.49	Spurger.....	4.0389792	10,939.04	35,889.2						

Village Mills north, 1931.....	30	35	30.854	184	27	11.15	4	27	26.45	Hillister eccentric.....	4.0127262	10,297.37	33,784.0
	94	24	07.367	238	07	44.04	58	13	14.00	Spurger.....	4.3073033	20,290.99	66,571.4
				263	32	27.26	83	36	09.52	Swearingen.....	4.0684170	11,706.23	38,406.2
Hillister, 1931.....	30	41	04.223	183	17	55.11	3	18	06.18	Woodville.....	4.0007582	10,017.47	32,865.6
	94	23	38.004	230	51	45.15	50	56	03.23	Town.....	4.2383499	17,312.11	56,798.1
				268	26	39.18	88	31	54.61	Spurger.....	4.2163354	16,456.42	53,990.8
				268	44	22	88	44	22	Hillister eccentric.....	1.2544514	17.966	58.94
				309	31	07.47	129	34	35.07	Swearingen.....	4.1481297	14,064.68	46,143.9
				4	21	27.96	184	21	13.00	Village Mills north.....	4.0126513	10,295.59	33,778.1
Cross, 1931.....	30	30	38.889	127	12	12.26	307	08	26.13	Village Mills north.....	4.1726084	14,880.19	48,819.4
	94	16	42.503	178	47	03.29	358	46	59.12	Swearingen.....	4.0129929	10,303.69	33,804.7
Village Mills south, 1931.....	30	30	13.355	178	36	34.04	358	36	29.51	Village Mills north.....	3.9903343	9,779.90	32,086.2
	94	23	58.459	225	46	00.61	45	49	38.05	Swearingen.....	4.2014792	15,903.02	52,175.2
				266	05	59.54	86	09	40.85	Cross.....	4.0663740	11,651.29	38,225.9
Olive, 1931.....	30	24	59.684	183	07	43.55	3	07	53.59	Village Mills south.....	3.9855829	9,673.48	31,737.1
	94	24	18.259	229	18	04.65	49	21	55.71	Cross.....	4.2049022	16,028.85	52,588.0
Reeves, 1931.....	30	23	55.954	96	47	09.78	276	41	55.01	Olive.....	4.2231163	16,715.38	54,840.4
	94	13	56.358	125	55	33.60	305	50	28.46	Village Mills south.....	4.2972605	19,827.16	65,049.6
				160	21	09.79	340	19	45.58	Cross.....	4.1197758	13,175.76	43,227.5
Kountze, 1931.....	30	19	57.362	175	31	22.72	355	31	08.91	Olive.....	3.9702502	9,337.92	30,636.2
	94	23	50.948	245	07	37.79	65	12	38.36	Reeves.....	4.2429142	17,495.01	57,398.2
Ellis, 1931.....	30	19	26.215	93	43	13.37	273	38	31.58	Kountze.....	4.1742997	14,938.25	49,009.9
	94	14	32.902	123	20	40.10	303	15	44.15	Olive.....	4.2718785	18,701.59	61,356.8
				186	41	54.33	6	42	12.79	Reeves.....	3.9223722	8,363.19	27,438.2
Grigsby, 1931.....	30	15	22.053	159	37	57.46	339	36	58.03	Kountze.....	3.9563291	9,043.35	29,669.7
	94	21	53.122	237	23	14.74	57	26	56.78	Ellis.....	4.1449369	13,961.66	45,805.9
Ariola, 1931.....	30	14	23.905	97	01	33.12	276	56	57.39	Grigsby.....	4.1685998	14,743.47	48,370.9
	94	12	45.758	120	03	52.32	299	58	16.86	Kountze.....	4.3124114	20,531.06	67,359.0
				162	54	51.21	342	53	57.19	Ellis.....	3.9886629	9,742.33	31,963.0
Peri, 1931.....	30	08	40.068	130	13	03.90	310	08	28.25	Grigsby.....	4.2829663	19,185.20	62,943.4
	94	12	45.123	179	54	29.24	359	54	28.92	Ariola.....	4.0246662	10,584.40	34,725.7
				4	03	11.38	184	02	57.26	Amelia.....	4.0280983	10,668.38	35,001.2
				50	10	29.96	230	06	24.49	China.....	4.2323671	17,075.25	56,021.0
Sour, 1931.....	30	06	55.651	175	34	35.00	355	34	12.31	Grigsby.....	4.1942322	15,639.84	51,311.7
	94	21	07.997	224	12	09.12	44	16	21.59	Ariola.....	4.2846778	19,260.96	63,192.0
				256	31	51.64	76	36	04.07	Peri.....	4.1411125	13,839.25	45,404.3
				300	15	30.55	120	19	28.50	Amelia.....	4.1680105	14,723.48	48,305.3
				357	20	48.39	177	20	55.09	China.....	3.8885538	7,736.66	25,382.7

TRIANGULATION IN TEXAS

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points							
Ashdown city water tank (Ark.), 1930.....	33 40 29.205	321 59 54.5	142 02 40.2	Ashdown southeast base.....	4.097913	12,528.9	41,105
	94 07 38.466	71 59 43.7	251 58 10.0	Hawkins.....	3.660629	4,577.5	15,018
		131 11 22.1	311 10 45.8	Ashdown northwest base.....	3.349533	2,236.3	7,337
New Boston water tank, 1930.....	33 26 12.367	261 34 09.0	81 38 15.0	Hooks.....	4.068312	11,703.4	38,397
	94 25 10.084	302 52 55.3	123 03 20.5	Alamo.....	4.565095	36,736.3	120,526
		330 44 22.8	150 49 51.1	Antioch.....	4.500965	31,693.1	103,980
Texarkana post office, square brick tower, 1930. ¹	33 25 29.78	97 24 52	277 16 32	Hooks.....	4.373466	23,630.1	77,526
	94 02 34.52	131 11 41	311 10 04	Holland.....	3.781474	6,046.1	19,836
Texarkana airplane beacon, 1930.....	33 25 17.469	12 59 03.8	192 57 34.2	Alamo.....	4.273626	18,777.0	61,604
	94 02 35.116	37 04 34.1	216 57 38.4	Antioch.....	4.512234	32,526.2	106,713
		133 53 12.1	313 51 35.4	Holland.....	3.798739	6,291.3	20,641
Texarkana, Cottonville Hospital spire (Ark.), 1930.	33 25 14.270	97 52 42.4	277 43 37.7	Hooks.....	4.411139	25,771.5	84,552
	94 01 13.379	123 52 32.4	303 50 10.6	Holland.....	3.903284	8,003.6	26,258
		173 05 56.4	353 05 08.9	Ashdown southeast base.....	4.265901	18,445.9	60,518
Texarkana, Southwest Gas & Electric Co., concrete stack, 1930.	33 25 03.542	13 36 47.3	193 35 15.4	Alamo.....	4.264446	18,384.3	60,316
	94 02 30.940	37 41 21.4	217 34 23.4	Antioch.....	4.508541	32,250.8	105,809
		135 54 05.9	315 52 26.8	Holland.....	3.824165	6,670.6	21,885
Texarkana, Texas & Pacific R.R. water tank, 1930.	33 24 56.927	10 35 03.7	190 33 53.6	Alamo.....	4.254551	17,970.1	58,957
	94 03 10.585	36 26 03.0	216 19 26.8	Antioch.....	4.497908	31,470.8	103,250
		144 04 31.5	324 03 14.3	Holland.....	3.790065	6,166.9	20,233
Texarkana, water tank southwest of, flat top, 1930. ¹	33 23 33.46	9 01 45	189 00 54	Alamo.....	4.184198	15,282.6	50,140
	94 03 45.45	160 14 15	340 13 17	Holland.....	3.905167	8,038.4	26,373
Loutexark eccentric, 1930.....	33 01 08.726	5 54 12.4	185 53 52.7	Posey.....	3.961296	9,147.4	30,011
	94 02 34.546	69 24 20.0	249 21 24.5	Pinkard.....	3.951173	8,936.6	29,319
		190 29 54.6	10 30 15.7	Ravana.....	3.742572	5,528.0	18,136
Loutexark boundary monument (La.-Tex.-Ark.), 1930. ¹	33 01 08.80	70 39 47	250 39 47	Loutexark eccentric.....	0.837588	6.88	22.6
	94 02 34.30						
Vivian, water tank (La.), 1930.....	32 52 28.482	140 45 42.4	320 43 44.1	Posey.....	3.951646	8,946.4	29,352
	93 59 32.926	193 59 57.2	14 01 15.4	Spearman.....	4.188169	15,423.0	50,600
		236 21 09.1	56 24 12.4	Myra.....	4.022408	10,529.5	34,546
Oil City, water tank (La.), 1930 ¹	32 40 13.84	296 15 15	116 21 00	Vance.....	4.269425	18,596.2	61,011
	93 54 36.48	331 55 37	151 57 18	Roy.....	4.012957	10,302.8	33,802
Oak (Tex.-La. boundary), 1930.....	32 33 32.300	212 57 15.3	32 59 13.3	Moor.....	4.020975	10,494.8	34,432
	94 02 33.882	268 06 31.7	88 08 39.0	Bryson.....	3.790525	6,173.4	20,254
		327 22 44.9	147 25 38.8	Greenwood.....	4.195457	15,684.0	51,457
Illinois Central R.R. water tank (1 mile east of White Pine Hospital) (La.), 1930.....	32 27 14.449	307 22 37.1	127 25 02.8	Shreveport north base.....	3.951173	8,936.6	29,319
	93 52 09.731	350 28 37.1	170 29 27.8	Shreveport south base.....	4.174706	14,952.2	49,056
		78 40 47.6	258 38 06.5	Greenwood.....	3.903377	8,005.3	26,264
Hemphill, water tank, 1931 ¹	31 20 29.97	96 20 13	276 15 19	Bronson.....	4.176585	15,017.1	49,269
	93 50 47.86	157 50 08	337 47 52	Geneva.....	4.259551	18,178.2	59,640
Village Mills, Kirby Lumber Co., third stack from east of 7, 1931. ¹	30 30 40.45	180 06 17	00 06 17	Village Mills north.....	3.951472	8,942.8	29,340
	94 24 07.98	343 04 22	163 04 27	Village Mills south.....	2.940544	872.1	2,861
Honey Island, tall stack, 1931 ¹	30 23 49.88	238 57 39	58 58 47	Olive.....	3.620112	4,169.8	13,680
	94 26 32.12	328 58 42	149 00 03	Kountze.....	3.921892	8,354.0	27,408
Honey Island, water tank, 1931 ¹	30 23 50.08	240 01 46	60 02 57	Olive.....	3.632643	4,291.8	14,081
	94 26 37.56	328 09 12	148 10 36	Kountze.....	3.926080	8,434.9	27,674
Kountze, courthouse spire, 1931 ¹	30 22 05.10	246 49 02	66 51 33	Reeves.....	3.938435	8,678.3	28,472
	94 18 55.21	63 32 50	243 30 21	Kountze.....	3.945657	8,823.8	28,949
Beaumont municipal water tank, 1931.....	30 05 35.111	66 54 03.2	246 50 26.6	Amelia.....	4.100125	12,592.9	41,315
	94 06 00.886	77 41 44.2	257 34 16.4	China.....	4.389277	24,506.3	80,401
		117 47 06.4	297 43 43.6	Perl.....	4.087380	12,228.7	40,120
Beaumont, San Jacinto Life Insurance Building, clock tower spire, 1931.	30 04 55.030	72 31 59.7	252 28 19.4	Amelia.....	4.091577	12,347.4	40,510
	94 05 53.613	80 37 08.4	260 29 36.9	China.....	4.388552	24,465.4	80,267
		122 11 50.9	302 08 24.4	Perl.....	4.114440	13,014.9	42,700
Beaumont, water tank (unidentified), 1931 ¹	30 04 47.14	74 44 03	254 40 06	Amelia.....	4.118913	13,149.6	43,142
	94 05 19.74	121 03 28	300 59 44	Perl.....	4.143475	13,914.7	45,652
Beaumont, Magnolia Petroleum Co., concrete stack, 1931.	30 03 58.004	82 08 29.9	262 04 06.1	Amelia.....	4.153617	14,243.5	46,731
	94 04 26.576	85 11 30.4	265 03 15.5	China.....	4.424284	26,563.4	87,150
		123 05 08.6	303 00 58.5	Perl.....	4.202078	15,924.9	52,247

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points							
Rogers, 1905.....	27 46 51.986	108 28 31.27	288 23 25.82	Elliff.....	4.2762486	18,890.72	61,977.3
	97 37 08.383	157 31 15.95	337 28 19.07	Nolan.....	4.4316302	27,016.57	88,636.9
Kaleta, 1905.....	27 54 08.273	32 26 48.17	212 24 22.56	Rogers.....	4.2016747	15,910.16	52,198.6
	97 31 56.602	74 18 51.45	254 11 19.65	Elliff.....	4.4388901	27,471.99	90,131.0
		121 29 17.81	301 23 54.43	Nolan.....	4.3444443	22,102.65	72,515.1
Corpus, 1905.....	27 47 18.453	87 48 17.66	267 42 23.70	Rogers.....	4.3181458	20,803.95	68,254.3
	97 24 29.070	135 52 48.58	315 49 19.54	Kaleta.....	4.2450380	17,580.77	57,679.6
Portland, 1905.....	27 53 02.455	34 05 22.21	214 03 20.00	Corpus.....	4.1066435	12,783.31	41,939.9
	97 20 07.353	67 51 52.17	247 43 55.46	Rogers.....	4.4796952	30,178.33	99,010.1
		96 00 30.92	275 54 59.11	Kaleta.....	4.2901147	19,503.60	63,988.1
Fairview, 1931.....	27 48 15.649	142 26 56.04	322 24 33.45	Kaleta.....	4.1365456	13,694.48	44,929.3
	97 26 51.410	231 21 58.75	51 25 07.48	Portland.....	4.1507028	14,148.25	46,418.1
Johnson, 1931.....	27 56 20.065	304 39 30.56	124 42 01.05	Portland.....	4.0289989	10,690.52	35,073.8
	97 25 28.843	8 37 07.78	188 36 29.17	Fairview.....	4.1784325	15,081.08	49,478.5
		69 05 14.83	249 02 13.26	Kaleta.....	4.0550795	11,352.19	37,244.6
McGloins Bluff, 1860.....	27 49 36.341	77 02 06.39	256 56 53.27	Corpus.....	4.2754466	18,855.87	61,863.0
	97 13 17.865	83 41 15.94	263 34 56.31	Fairview.....	4.3503359	22,404.53	73,505.5
		119 32 57.19	299 29 45.86	Portland.....	4.1097520	12,875.14	42,241.2
		121 54 35.81	301 48 53.96	Johnson.....	4.3718354	23,541.57	77,236.0
Floerke, 1931.....	27 56 52.987	318 52 18.15	138 55 38.66	McGloins Bluff.....	4.2513012	17,836.15	58,517.4
	97 20 26.547	355 46 07.03	175 46 16.02	Portland.....	3.8522065	7,115.52	23,344.8
		33 29 38.10	213 26 38.15	Fairview.....	4.2808001	19,089.74	62,630.3
		83 01 42.65	262 59 21.00	Johnson.....	3.9204324	8,325.92	27,316.0
Blanco, 1931.....	27 59 10.261	337 33 29.41	157 35 34.18	McGloins Bluff.....	4.2812896	19,111.27	62,700.9
	97 17 44.451	46 21 56.81	226 20 40.79	Floerke.....	3.7869176	6,122.34	20,086.4
Aransas, 1931.....	27 55 03.584	29 06 04.05	209 04 28.28	McGloins Bluff.....	4.0617092	11,526.81	37,817.5
	97 09 53.015	101 02 36.97	280 57 40.20	Floerke.....	4.2466269	17,645.21	57,891.0
		120 32 16.34	300 28 35.36	Blanco.....	4.1748599	14,957.53	49,073.2

Bayside, 1931.....	28 05 22.229	345 43 46.70	165 45 09.87	Aransas.....	4.2933275	19,648.41	64,463.2
	97 12 50.139	35 05 27.75	215 03 09.41	Blanco.....	4.1458214	13,990.12	45,899.3
Rockport, 1931.....	28 01 31.042	42 41 25.19	222 38 16.56	Aransas.....	4.2100316	16,219.28	53,212.8
	97 03 10.833	79 46 00.00	259 39 09.79	Blanco.....	4.3848732	24,259.02	79,589.8
		114 15 27.63	294 10 55.15	Bayside.....	4.2392253	17,347.04	56,912.7
Lamar, 1931.....	28 06 05.736	26 13 57.42	206 12 14.27	Rockport.....	4.1317127	13,542.93	44,432.1
	96 59 31.694	77 02 52.43	256 56 36.20	Bayside.....	4.3496100	22,367.12	73,382.8
Causeway, 1931.....	28 06 35.250	231 18 29.11	51 19 29.19	Lamar.....	3.6489956	4,456.52	14,621.1
	97 01 39.158	14 58 21.57	194 57 38.43	Rockport.....	3.8664590	9,693.02	31,801.2
		83 02 51.55	262 57 35.51	Bayside.....	4.2660877	18,453.88	60,544.1
Hallinan, 1931.....	28 18 54.758	349 40 57.65	169 42 00.69	Lamar.....	4.3076372	20,306.60	66,622.6
	97 01 44.967	359 36 03.50	179 36 06.25	Causeway.....	4.3572634	22,764.77	74,687.4
		35 59 46.28	215 54 31.93	Bayside.....	4.4899290	30,897.90	101,370.9
Cardwell, 1931.....	28 16 34.198	35 04 22.17	215 01 11.90	Lamar.....	4.2814495	19,118.31	62,724.0
	96 52 49.127	38 08 02.37	218 03 51.96	Causeway.....	4.3697543	23,429.03	76,866.7
		106 32 32.43	286 28 18.42	Hallinan.....	4.1826531	15,228.36	49,961.7
Austwell, 1931.....	28 22 42.674	24 40 50.13	204 39 19.39	Cardwell.....	4.0962865	12,482.07	40,951.6
	96 49 37.885	70 32 18.20	250 26 32.97	Hallinan.....	4.3223944	21,008.47	68,925.3
Fagan, 1931.....	28 29 00.359	309 05 07.21	129 09 17.32	Austwell.....	4.2654602	18,427.24	60,456.7
	96 58 23.218	338 22 25.55	158 25 04.35	Cardwell.....	4.3927873	24,705.14	81,053.4
		16 25 40.24	196 24 04.28	Hallinan.....	4.2885807	19,434.83	63,762.4
Welder, 1931.....	28 33 42.163	2 48 47.89	182 48 30.42	Austwell.....	4.3080568	20,326.23	66,687.0
	96 49 01.243	60 27 07.98	240 22 39.63	Fagan.....	4.2448000	17,571.14	57,648.0
Roemer, 1931.....	28 27 58.159	55 16 08.58	235 12 03.88	Austwell.....	4.2312668	17,032.05	55,879.3
	96 41 03.783	93 56 34.44	273 48 18.86	Fagan.....	4.4524009	28,340.07	92,979.0
		129 14 02.85	309 10 14.92	Welder.....	4.2241319	16,754.52	54,968.8
Magnolia, 1931.....	28 34 06.674	45 48 48.55	225 45 23.83	Roemer.....	4.2113327	16,267.94	53,372.4
	96 33 54.986	88 18 19.79	268 11 06.45	Welder.....	4.3916951	24,643.09	80,849.9
Wilson, 1931.....	28 41 26.298	318 07 07.75	138 10 41.59	Magnolia.....	4.2593338	18,169.12	59,609.9
	96 41 21.275	358 54 15.05	178 54 23.42	Roemer.....	4.3958991	24,882.79	81,636.3
		41 11 55.34	221 08 14.97	Welder.....	4.2783126	18,980.72	62,272.6
Cavallin, 1931.....	28 41 15.020	33 16 29.69	213 13 57.17	Magnolia.....	4.1977950	15,768.67	51,734.4
	96 28 36.662	91 00 33.33	270 54 26.27	Wilson.....	4.3172322	20,760.23	68,110.9
Lolita, 1931.....	28 50 04.095	338 15 04.18	158 16 59.34	Cavallin.....	4.2438840	17,534.12	57,526.5
	96 32 35.983	4 09 59.91	184 09 21.97	Magnolia.....	4.4705909	29,552.27	96,956.1
		41 49 51.00	221 45 38.24	Wilson.....	4.3300419	21,381.68	70,149.7
Slaikeu, 1931.....	28 41 50.272	82 46 43.59	262 44 12.56	Cavallin.....	3.9349286	8,608.52	28,243.1
	96 23 22.080	135 22 17.45	315 17 50.89	Lolita.....	4.3299114	21,375.26	70,128.7

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Francitas, 1931.....	28 50 54.055	10 53 06.00	190 52 08.92	Slaiken.....	4.2316450	17,046.88	55,928.0
	96 21 23.492	33 25 17.39	213 21 48.92	Cavallin.....	4.3294055	21,350.37	70,047.0
		85 13 20.94	265 07 56.53	Lolita.....	4.2623255	18,294.71	60,021.9
Palacios south base, 1931.....	28 42 05.642	88 25 06.09	268 20 10.61	Slaiken.....	4.2229488	16,708.93	54,819.2
	96 13 06.779	140 23 59.95	320 20 00.84	Francitas.....	4.3247482	21,122.64	69,299.9
Palacios north base, 1931.....	28 50 49.099	0 15 36.48	180 15 35.18	Palacios south base.....	4.2072317	16,115.052	52,870.80
	96 13 04.083	45 20 35.81	225 15 38.35	Slaiken.....	4.3726107	23,583.63	77,374.0
		90 40 45.30	270 36 44.34	Francitas.....	4.1315571	13,538.08	44,416.2
Clapper, 1931.....	28 50 58.770	41 05 02.79	221 00 49.15	Palacios south base.....	4.3377200	21,763.06	71,401.0
	96 04 19.893	88 50 05.06	268 45 52.14	Palacios north base.....	4.1525550	14,211.99	46,627.2
Matagorda longitude station, 1911.....	28 41 35.430	92 14 29.04	272 07 17.12	Palacios south base.....	4.3880066	24,434.68	80,166.1
	95 58 07.289	125 04 38.40	304 57 26.78	Palacios north base.....	4.4728157	29,704.05	97,454.0
		149 47 28.36	329 44 29.02	Clapper.....	4.3026132	20,073.04	65,856.3
Poole 1931.....	28 47 54.640	46 02 33.96	225 58 59.59	Matagorda longitude station.....	4.2255548	16,809.50	55,149.2
	95 50 41.542	104 23 10.76	284 16 36.21	Clapper.....	4.3598409	22,900.29	75,132.0
Steinmeyer, 1931.....	28 56 14.793	342 41 19.51	162 42 44.94	Poole.....	4.2075587	16,127.19	52,910.6
	95 53 38.495	15 05 09.61	195 03 00.05	Matagorda longitude station.....	4.4477115	28,035.70	91,980.5
		60 48 04.64	240 42 54.72	Clapper.....	4.2992114	19,916.43	65,342.5
Estill, 1931.....	28 56 26.499	32 41 48.66	212 38 48.62	Poole.....	4.2723056	18,719.99	61,417.2
	95 44 28.654	88 39 02.16	268 34 36.10	Steinmeyer.....	4.1730571	14,895.57	48,869.9
Pierce, 1931.....	28 48 41.464	85 36 56.36	265 31 25.77	Poole.....	4.2709401	18,661.22	61,224.4
	95 39 15.437	120 52 58.24	300 46 01.47	Steinmeyer.....	4.4351418	27,235.91	89,356.5
		149 21 30.26	329 18 59.00	Estill.....	4.2212462	16,643.56	54,604.7
Woosley, 1931.....	29 00 29.559	6 52 16.95	186 51 30.12	Pierce.....	4.3415712	21,956.91	72,037.0
	95 37 38.558	56 02 55.32	235 59 36.66	Estill.....	4.1267481	13,389.00	43,927.1
McNeel, 1852.....	28 53 43.221	56 31 36.55	236 27 26.74	Pierce.....	4.2260283	16,827.84	55,209.3
	95 30 37.775	102 38 44.07	282 32 02.29	Estill.....	4.3628882	23,061.53	75,661.0
		137 41 56.53	317 38 32.84	Woosley.....	4.2284319	16,921.23	55,515.7

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Brazoria, 1931.....	29 03 07.361	343 35 21.84	163 36 53.29	McNeel.....	4.2577806	18,104.25	59,397.0
	95 33 46.553	52 16 50.14	232 14 57.56	Woosley.....	3.8997160	7,938.09	26,043.6
Jones, 1931.....	28 58 08.434	47 28 54.48	227 26 15.55	McNeel.....	4.0819343	12,076.31	39,620.4
	95 25 09.253	102 08 25.90	282 02 22.76	Woosley.....	4.3168859	20,743.68	68,056.6
		123 21 12.13	303 17 01.25	Brazoria.....	4.2241230	16,754.17	54,967.6
Angleton, 1931.....	29 09 07.725	353 50 10.03	173 50 49.36	Jones.....	4.3099560	20,415.31	66,979.2
	95 26 30.215	46 47 28.49	226 43 56.27	Brazoria.....	4.2093974	16,195.61	53,135.1
Pharr, 1931.....	29 02 20.339	46 57 52.21	226 55 23.52	Jones.....	4.0553589	11,359.49	37,268.6
	95 20 02.586	93 46 15.95	273 39 35.91	Brazoria.....	4.3490717	22,339.41	73,291.9
		140 08 19.26	320 05 10.77	Angleton.....	4.2134055	16,345.77	53,627.7
Hoskins, 1931.....	29 08 19.979	43 09 42.52	223 06 36.02	Pharr.....	4.1810701	15,172.95	49,779.9
	95 13 38.976	94 05 08.94	273 58 53.32	Angleton.....	4.3200943	20,897.50	68,561.2
Danbury, 1931.....	29 13 51.377	312 26 14.12	132 29 35.32	Hoskins.....	4.1793283	15,112.22	49,580.7
	95 20 31.585	357 53 16.49	177 53 30.60	Pharr.....	4.3281667	21,289.56	69,847.5
		47 59 43.41	227 56 48.49	Angleton.....	4.1154055	13,043.84	42,794.7
Liverpool, 1931.....	29 17 47.583	344 42 18.18	164 43 44.47	Hoskins.....	4.2580572	18,115.79	59,434.9
	95 16 35.765	41 13 01.93	221 11 06.65	Danbury.....	3.9852184	9,665.37	31,710.5
Hughes, 1931.....	29 15 40.839	41 49 27.08	221 45 47.97	Hoskins.....	4.2601981	18,205.31	59,728.6
	95 06 09.850	81 49 03.50	261 42 02.49	Danbury.....	4.3712853	23,511.77	77,138.2
		103 02 49.98	282 57 43.87	Liverpool.....	4.2390653	17,340.65	56,891.8
Alvin, 1931.....	29 24 31.358	320 02 32.70	140 06 40.90	Hughes.....	4.3283412	21,298.12	69,875.6
	95 14 36.473	14 31 13.47	194 30 14.99	Liverpool.....	4.1086055	12,841.20	42,129.8
Alta Loma, 1931.....	29 22 05.123	6 22 30.62	186 22 06.64	Hughes.....	4.0757253	11,904.89	39,058.0
	95 05 20.888	66 30 50.52	246 25 19.91	Liverpool.....	4.2979716	19,859.65	65,156.2
		106 45 53.43	286 41 20.79	Alvin.....	4.1943285	15,643.31	51,323.1
Dickinson, 1931.....	29 29 00.239	7 01 40.03	187 01 11.32	Alta Loma.....	4.1098292	12,877.43	42,248.7
	95 04 22.470	63 27 48.77	243 22 46.92	Alvin.....	4.2672326	18,502.59	60,703.9
Eignus, 1931.....	29 32 27.563	294 13 11.59	114 17 30.71	Dickinson.....	4.1914013	15,538.22	50,978.3
	95 13 08.473	326 38 35.92	146 42 25.85	Alta Loma.....	4.3605050	22,935.33	75,247.0
		9 11 30.04	189 10 46.74	Alvin.....	4.1717915	14,852.23	48,727.7
Peden, 1931.....	29 33 50.357	14 17 59.72	194 17 18.08	Dickinson.....	3.9646279	9,217.81	30,242.1
	95 02 57.957	81 13 33.04	261 08 31.92	Eignus.....	4.2209608	16,632.62	54,568.9
Genoa, 1931.....	29 37 20.870	293 41 24.00	113 45 54.61	Peden.....	4.2070331	16,107.68	52,846.6
	95 12 05.917	320 58 48.34	141 02 36.94	Dickinson.....	4.2973396	19,830.77	65,061.5
		10 33 53.84	190 33 22.96	Eignus.....	3.9631405	9,186.30	30,138.7
Shell, 1931.....	29 42 40.343	334 25 08.29	154 27 31.78	Peden.....	4.2574005	18,088.41	59,345.1
	95 07 48.103	35 11 41.02	215 09 33.41	Genoa.....	4.0804174	12,034.20	39,482.2

Gulf Coast arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Morgan Point 2, 1931.....	29 40 51.731	25 25 06.65	205 23 13.46	Peden.....	4.1572302	14,362.50	47,121.0
	94 59 08.942	72 47 39.71	252 41 15.32	Genoa.....	4.3400928	21,882.29	71,792.1
		103 30 36.53	283 26 19.34	Shell.....	4.1569104	14,351.93	47,086.3
San Jacinto, 1931.....	29 47 33.239	330 59 33.24	151 01 39.67	Morgan Point 2.....	4.1502420	14,133.25	46,368.8
	95 03 23.838	38 13 58.81	218 11 47.67	Shell.....	4.0598678	11,478.04	37,657.5
Davis (U.S.E.), 1900.....	29 44 08.935	326 27 36.56	146 28 50.74	Morgan Point 2.....	3.8623653	7,283.92	23,897.3
	95 01 38.621	74 39 57.20	254 36 54.01	Shell.....	4.0127580	10,298.12	33,786.4
		155 48 36.14	335 47 43.91	San Jacinto.....	3.8386268	6,896.47	22,626.2
Beazley, 1931.....	29 41 32.746	83 48 15.92	263 44 42.67	Morgan Point 2.....	4.0661658	11,645.71	38,207.6
	94 51 58.346	121 07 11.01	301 01 30.94	San Jacinto.....	4.3325547	21,505.76	70,556.8
Barber, 1931.....	29 49 59.187	353 44 06.32	173 44 37.93	Beazley.....	4.1955379	15,686.93	51,466.2
	94 53 02.020	30 20 46.38	210 17 44.27	Morgan Point 2.....	4.2906424	19,527.31	64,065.8
		74 58 47.27	254 53 38.13	San Jacinto.....	4.2378319	17,291.47	56,730.4
Scherer, 1931.....	29 43 00.476	81 00 03.72	260 54 50.84	Beazley.....	4.2351974	17,186.89	56,387.3
	94 41 26.929	124 40 17.03	304 34 31.85	Barber.....	4.3558396	22,690.27	74,443.0
Collins, 1931.....	29 51 47.477	356 50 52.29	176 51 08.81	Scherer.....	4.2108810	16,251.03	53,316.9
	94 42 00.176	40 22 10.54	220 17 13.47	Beazley.....	4.3949435	24,828.10	81,456.9
		79 24 58.11	259 19 28.71	Barber.....	4.2571037	18,076.06	59,304.5
Moon, 1931.....	29 43 02.341	89 26 02.49	269 24 17.97	Scherer.....	3.7534094	5,667.73	18,594.9
	94 37 56.071	157 56 42.45	337 54 41.17	Collins.....	4.2417389	17,447.73	57,243.1
McBride, 1931.....	29 52 25.477	4 19 14.80	184 18 50.58	Moon.....	4.2402608	17,388.45	57,048.6
	94 37 07.330	21 51 27.26	201 49 18.27	Scherer.....	4.2728074	18,741.63	61,488.2
		81 33 09.42	261 30 43.58	Collins.....	3.9001416	7,945.87	26,069.1
Winnie south base, 1931.....	29 43 21.277	88 43 21.84	263 35 42.46	Moon.....	4.3964102	24,912.09	81,732.4
	94 22 29.438	125 27 42.61	305 20 26.35	McBride.....	4.4612686	28,924.68	94,897.1
Winnie north base, 1931.....	29 52 39.184	357 57 35.22	177 57 46.53	Winnie south base.....	4.2352511	17,189.020	56,394.31
	94 22 52.207	53 52 13.35	233 44 44.19	Moon.....	4.4782562	30,078.50	98,682.5
		89 00 19.61	268 53 13.66	McBride.....	4.3608133	22,951.62	75,300.4
Riedel, 1931.....	29 45 21.826	73 24 40.65	253 20 51.11	Winnie south base.....	4.1131582	12,976.52	42,573.8
	94 14 46.713	135 57 49.02	315 53 47.62	Winnie north base.....	4.2728305	18,742.63	61,491.4
Burrell, 1931.....	29 52 42.342	8 59 19.29	188 58 39.58	Riedel.....	4.1377368	13,732.09	45,052.7
	94 13 26.859	40 11 03.44	220 06 33.78	Winnie south base.....	4.3541095	22,600.06	74,147.0
		89 40 18.89	269 35 37.26	Winnie north base.....	4.1810263	15,171.42	49,774.9
Gilbert, 1931.....	29 57 01.133	301 13 46.25	121 17 50.25	Burrell.....	4.1862250	15,354.12	50,374.3
	94 21 36.120	14 12 22.28	194 11 44.34	Winnie north base.....	3.9201159	8,319.86	27,296.1
Fannett, 1931.....	29 56 30.925	348 14 14.26	168 14 41.49	Burrell.....	3.8566750	7,189.11	23,586.3
	94 14 21.473	62 31 30.98	242 27 16.31	Winnie north base.....	4.1888695	15,447.90	50,682.0
		94 35 33.84	274 31 56.87	Gilbert.....	4.0679213	11,692.88	38,362.4
China, 1931.....	30 02 44.662	317 29 28.46	137 32 45.00	Fannett.....	4.1932332	15,603.90	51,193.8
	94 20 54.629	6 00 16.74	185 59 55.99	Gilbert.....	4.0267770	10,635.97	34,894.8
Amelia, 1931.....	30 02 54.465	8 48 14.26	188 47 40.16	Fannett.....	4.0773794	11,950.32	39,207.0
	94 13 13.271	51 07 24.36	231 08 12.93	Gilbert.....	4.2385675	17,320.78	56,826.6
		88 37 59.04	268 34 08.03	China.....	4.0921341	12,363.29	40,561.9
Beaumont, 1931.....	30 03 21.313	45 38 53.56	225 34 52.72	Fannett.....	4.2568472	18,065.38	59,269.5
	94 06 19.785	85 45 37.43	265 42 10.36	Amelia.....	4.0456108	11,107.36	36,441.4
Hebert, 1931.....	29 56 25.732	90 45 12.92	270 41 16.36	Fannett.....	4.1041964	12,711.49	41,704.3
	94 06 27.521	137 46 10.81	317 42 47.97	Amelia.....	4.2087770	16,172.49	53,059.2
		180 55 39.91	0 55 43.78	Beaumont.....	4.1071402	12,797.94	41,987.9
Stephenson, 1931.....	30 04 53.897	35 01 12.52	214 57 48.10	Hebert.....	4.2810241	19,099.59	62,662.6
	93 59 38.823	75 09 40.92	255 06 20.02	Beaumont.....	4.0457616	11,111.22	36,454.1
Doornbos, 1931.....	29 56 45.791	87 43 40.70	267 38 55.92	Hebert.....	4.1850580	15,312.92	50,239.1
	93 56 56.981	128 57 19.86	308 52 38.45	Beaumont.....	4.2875100	19,386.97	63,605.4
		163 54 51.71	343 53 30.76	Stephenson.....	4.1943119	15,642.71	51,321.1
Stark, 1931.....	30 07 48.637	19 20 54.12	199 18 40.35	Doornbos.....	4.3350411	21,629.23	70,961.9
	93 52 29.761	64 55 57.17	244 52 21.95	Stephenson.....	4.1032993	12,685.26	41,618.2
Dunn, 1931.....	30 00 38.357	54 22 33.86	234 19 27.77	Doornbos.....	4.0894306	12,286.57	40,310.2
	93 50 44.556	118 50 12.01	298 45 44.51	Stephenson.....	4.2130707	16,333.18	53,586.4
		168 00 03.11	347 59 10.40	Stark.....	4.1317892	13,545.32	44,439.9
Reese, 1931.....	30 12 04.817	23 17 55.58	203 15 05.24	Dunn.....	4.3619146	23,009.89	75,491.6
	93 45 04.960	56 29 43.31	236 25 59.80	Stark.....	4.1546859	14,278.61	46,845.7
Orange, 1931.....	30 05 20.676	50 24 21.12	230 21 04.85	Dunn.....	4.1345457	13,631.56	44,722.9
	93 44 12.601	108 55 48.57	288 51 39.17	Stark.....	4.1482477	14,068.50	46,156.4
		173 34 43.98	353 34 17.69	Reese.....	4.0977067	12,522.95	41,085.7
Vinton (La.), 1931.....	30 14 28.343	29 16 23.44	209 13 26.09	Orange.....	4.2861854	19,327.93	63,411.7
	93 38 19.672	67 50 41.03	247 47 17.03	Reese.....	4.0683672	11,704.89	38,401.8

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued							
Ged (La.), 1931.....	30 08 05.800	69 15 19.56	249 11 08.46	Orange.....	4. 1562965	14, 331. 66	47, 019. 8
	93 35 52. 102	116 29 24. 65	296 24 46. 82	Reese.....	4. 2180771	16, 552. 55	54, 207. 7
		161 28 55. 89	341 27 41. 69	Vinton.....	4. 0942350	12, 423. 24	40, 758. 6
Supplementary points							
Robstown, R.R. water tank, 1905.....	27 47 10. 043	111 43 51. 1	291 39 59. 0	Elliff.....	4. 165907	14, 652. 3	48, 072
	97 39 45. 741	224 53 14. 8	44 56 53. 9	Kaleta.....	4. 259595	18, 180. 0	59, 646
		277 20 28. 7	97 21 42. 1	Rogers.....	3. 637868	4, 343. 8	14, 251
Robstown, municipal water tank, 1931.....	27 47 16. 296	225 27 13. 7	45 30 53. 8	Kaleta.....	4. 257377	18, 087. 4	59, 342
	97 39 47. 960	234 29 16. 0	54 35 57. 5	Johnson.....	4. 460210	28, 854. 3	94, 666
		265 02 15. 6	85 08 17. 7	Fairview.....	4. 329114	21, 336. 0	70, 000
Clarkwood, municipal water tank, 1931.....	27 47 02. 321	181 21 35. 5	1 21 40. 8	Kaleta.....	4. 117770	13, 115. 1	43, 028
	97 32 07. 983	212 25 56. 6	32 29 03. 1	Johnson.....	4. 308492	20, 346. 6	66, 754
		255 22 51. 8	75 25 19. 4	Fairview.....	3. 952080	8, 955. 3	29, 381
Sinton, municipal water tank, 1931.....	28 02 31. 577	323 33 48. 9	143 36 13. 8	Johnson.....	4. 152622	14, 210. 9	46, 624
	97 30 37. 574	346 46 35. 0	166 48 20. 9	Fairview.....	4. 432374	27, 062. 9	88, 789
		7 56 30. 1	187 55 53. 1	Kaleta.....	4. 194305	15, 642. 5	51, 320
Rosita ranch house, south chimney, 1905 ¹	27 52 27. 69	326 40 31	146 42 18	Corpus.....	4. 056514	11, 389. 7	37, 368
	97 28 17. 64	117 21 09	297 19 26	Kaleta.....	3. 828791	6, 742. 0	22, 119
B.M. F 9 (U.S.G.S.), 1931.....	27 56 20. 246	72 17 10	252 17 10	Johnson.....	1. 262166	18. 288	60. 00
Corpus Christi, Port Compress Co., tank, 1931.....	27 47 18. 703	120 31 03. 0	300 30 12. 2	Fairview.....	3. 538142	3, 452. 6	11, 327
	97 25 02. 750	138 05 46. 2	318 02 32. 9	Kaleta.....	4. 229069	16, 946. 1	55, 597
		217 21 31. 2	37 23 49. 1	Portland.....	4. 124356	13, 315. 5	43, 686
Corpus Christi, new municipal incinerator stack, 1931.....	27 48 15. 779	89 57 19. 9	269 56 07. 8	Fairview.....	3. 625776	4, 224. 5	13, 860
	97 24 17. 076	130 49 26. 1	310 45 51. 4	Kaleta.....	4. 220298	16, 607. 3	54, 486
		217 44 10. 3	37 46 06. 9	Portland.....	4. 047685	11, 160. 5	36, 616
Corpus Christi, Plaza Hotel elevator pent-house, center of sign, 1931.....	27 47 46. 179	100 11 20. 8	280 09 54. 7	Fairview.....	3. 710447	5, 133. 9	16, 843
	97 23 46. 811	169 59 57. 3	349 59 09. 6	Johnson.....	4. 205813	16, 062. 5	52, 698
		211 39 13. 0	31 40 55. 4	Portland.....	4. 058369	11, 438. 5	37, 528
Corpus Christi, Aransas Compress Co., tank, 1931.....	27 48 36. 475	82 45 30. 0	262 44 04. 2	Fairview.....	3. 705610	5, 077. 0	16, 657
	97 23 47. 410	169 00 11. 1	348 59 23. 7	Johnson.....	4. 162481	14, 537. 2	47, 694
		216 19 03. 7	36 20 46. 4	Portland.....	4. 007018	10, 162. 9	33, 343
Corpus Christi, Port, tank, 1931.....	27 48 39. 276	81 47 22. 8	261 45 57. 1	Fairview.....	3. 706311	5, 085. 2	16, 684
	97 23 47. 534	168 57 04. 2	348 56 16. 9	Johnson.....	4. 159926	14, 451. 9	47, 414
		216 37 23. 2	36 39 06. 0	Portland.....	4. 004132	10, 095. 6	33, 122
Corpus Christi, Catholic Church spire, 1905.....	27 47 48. 617	85 29 22. 5	265 23 10. 5	Rogers.....	4. 340749	21, 915. 4	71, 901
	97 23 50. 396	131 19 46. 9	311 15 59. 8	Kaleta.....	4. 248149	17, 707. 2	58, 094
		212 16 10. 2	32 17 54. 4	Portland.....	4. 057924	11, 426. 8	37, 489
Corpus Christi, standpipe, 1905.....	27 47 41. 950	23 51 05. 2	203 50 59. 7	Corpus.....	2. 898072	790. 8	2, 594
	97 24 17. 390	85 52 57. 0	265 46 57. 6	Rogers.....	4. 325579	21, 163. 1	69, 433
		133 27 11. 1	313 23 36. 6	Kaleta.....	4. 238038	17, 299. 7	56, 757
Corpus Christi, Dr. Spohn's house, cupola, 1905.....	27 47 37. 139	63 31 41. 6	243 31 21. 9	Corpus.....	3. 110655	1, 290. 2	4, 233
	97 23 46. 883	86 25 39. 4	266 19 25. 7	Rogers.....	4. 342154	21, 986. 4	72, 134
		210 56 43. 4	30 58 25. 9	Portland.....	4. 067341	11, 677. 3	38, 311
Corpus Christi, Epworth League Pavilion, flagpole, 1905.....	27 49 33. 343	28 49 14. 2	208 48 35. 3	Corpus.....	3. 675671	4, 738. 8	15, 547
	97 23 05. 624	120 15 31. 7	300 11 23. 6	Kaleta.....	4. 225608	16, 811. 6	55, 156
		217 08 29. 9	37 09 53. 2	Portland.....	3. 907195	8, 076. 0	26, 496
Corpus Christi, Central Light and Power Co., stack, 1931.....	27 47 32. 144	104 15 19. 6	284 13 49. 7	Fairview.....	3. 735821	5, 442. 8	17, 857
	97 23 38. 690	131 51 40. 2	311 47 47. 7	Kaleta.....	4. 262057	18, 283. 4	59, 985
		169 30 05. 3	349 29 13. 8	Johnson.....	4. 218198	16, 527. 2	54, 223
Corpus Christi, lighthouse, 1905.....	27 47 21. 299	88 18 54. 0	268 18 03. 5	Corpus.....	3. 472203	2, 966. 2	9, 732
	97 22 40. 768	201 46 48. 9	21 48 00. 5	Portland.....	4. 053434	11, 309. 3	37, 104
		254 51 55. 1	74 56 17. 7	McGloins Bluff.....	4. 202989	15, 958. 4	52, 357
Alta Vista Hotel, south spire, 1905.....	27 45 34. 163	95 48 42. 6	275 41 58. 1	Rogers.....	4. 378151	23, 886. 4	78, 367
	97 22 40. 408	196 52 35. 0	16 53 46. 4	Portland.....	4. 158987	14, 420. 7	47, 312
		137 10 57. 8	317 10 07. 1	Corpus.....	3. 641160	4, 376. 8	14, 360
McHarry's barn, cupola, 1905 ¹	27 54 18. 65	347 49 29	167 49 38	Portland.....	3. 380083	2, 399. 3	7, 872
	97 20 25. 85	89 04 35	268 59 12	Kaleta.....	4. 276301	18, 893. 0	61, 985
Bay View College, recitation hall belfry, 1905.....	27 52 12. 086	99 52 40. 6	279 46 47. 6	Kaleta.....	4. 321194	20, 950. 5	68, 735
	97 19 21. 885	141 16 00. 0	321 15 38. 7	Portland.....	3. 298331	1, 987. 6	6, 521
		295 40 44. 5	115 43 34. 6	McGloins Bluff.....	4. 043512	11, 053. 8	36, 266
Gregory, Catholic church steeple, 1931 ¹	27 55 02. 24	100 32 08	280 28 27	Johnson.....	4. 118562	13, 139. 0	43, 107
	97 17 36. 34	178 20 16	358 20 12	Blanco.....	3. 882959	7, 637. 6	25, 058
Refugio, tall silver tank, 1931 ¹	28 17 54. 07	234 54 30	55 03 01	Fagan.....	4. 553166	35, 740. 9	117, 260
	97 16 18. 36	265 27 13	85 34 08	Hallinan.....	4. 377841	23, 869. 4	78, 312

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Aransas Pass, new municipal tank, 1931.....	27 54 30.792	38 08 43.0	218 06 41.5	McGloins Bluff.....	4.061531	11,522.1	37,802
	97 08 57.817	123 46 32.3	303 46 06.5	Aransas.....	3.259072	1,815.8	5,957
		216 13 22.9	36 16 05.7	Rockport.....	4.205204	16,040.0	52,625
Aransas Pass, old municipal tank, 1931.....	27 54 14.810	42 48 31.7	222 46 16.2	McGloins Bluff.....	4.067458	11,680.4	38,321
	97 08 27.825	122 48 21.7	302 47 41.8	Aransas.....	3.442708	2,771.5	9,093
		212 48 37.4	32 51 06.1	Rockport.....	4.203592	15,960.6	52,430
Aransas Pass, lighthouse, 1931.....	27 51 49.898	75 53 11.0	255 48 32.7	McGloins Bluff.....	4.225672	16,814.0	55,164
	97 03 22.015	119 09 54.0	299 06 51.1	Aransas.....	4.087914	12,243.7	40,170
		180 58 42.1	0 58 47.4	Rockport.....	4.252641	17,891.3	58,698
Aransas Pass, Warehouse & Terminal Co., tank, 1931.	27 50 53.600	81 23 53.9	261 19 26.8	McGloins Bluff.....	4.199551	15,832.6	51,944
	97 03 45.841	127 28 56.1	307 26 04.3	Aransas.....	4.102165	12,652.2	41,510
		182 47 25.0	2 47 41.4	Rockport.....	4.293249	19,644.9	64,452
Rockport, Presbyterian church spire, 1931 ¹	28 01 10.47	178 36 14	358 36 13	Rockport.....	2.801636	633.3	2,078
	97 03 10.27	193 58 08	13 58 50	Causeway.....	4.012933	10,302.3	33,800
Rockport, courthouse dome, 1905.....	28 01 32.156	39 38 35.1	219 38 34.6	Rockport.....	1.648431	44.5	146
	97 03 09.794	42 40 55.7	222 37 46.6	Aransas.....	4.211221	16,263.8	53,359
		114 06 58.2	294 02 25.2	Bayside.....	4.239522	17,358.9	56,952
Rockport, First National Bank Building, tank, 1931. ¹	28 01 14.29	154 34 53	334 34 49	Rockport.....	2.756461	570.8	1,873
	97 03 01.86	192 52 14	12 52 53	Causeway.....	4.005807	10,134.6	33,250
Oak, 1911.....	28 04 45.584	14 55 44.1	194 55 16.5	Rockport.....	3.792217	6,197.5	20,333
	97 02 12.386	195 02 17.5	15 02 33.1	Causeway.....	3.543511	3,495.5	11,468
		215 26 14.5	35 27 30.2	Lamar.....	3.878696	7,563.0	24,813
Lamar, Catholic Church tank, 1931 ¹	28 08 05.88	26 04 53	206 03 10	Rockport.....	4.131310	13,530.4	44,391
	96 59 33.07	50 58 33	230 57 34	Causeway.....	3.646410	4,430.1	14,534
Ballou House, 1911.....	28 08 04.288	26 22 36.3	206 20 52.8	Rockport.....	4.130656	13,510.0	44,324
	96 59 31.111	51 54 07.4	231 53 07.0	Causeway.....	3.647509	4,441.3	14,571
		160 22 56.7	340 22 56.4	Lamar.....	1.675129	47.3	155
Gin tank north of station Cardwell, 1931 ¹	28 20 07.78	343 32 22	163 32 56	Cardwell.....	3.836055	6,855.8	22,498
	96 54 00.41	156 26 39	336 24 34	Fagan.....	4.252546	17,887.3	58,685

Austwell municipal tank, 1931.....	28 23 08.412	298 17 05.0	118 17 30.6	Austwell.....	3.223207	1,671.9	5,485
	96 50 31.958	17 07 20.7	197 06 15.6	Cardwell.....	4.103717	12,697.5	41,658
		130 13 23.1	310 09 38.7	Fagan.....	4.225006	16,788.3	55,080
Austwell, Austwell Gin Co., tank, 1931.....	28 23 08.911	300 49 10.4	120 49 34.0	Austwell.....	3.197625	1,576.2	5,171
	96 50 27.601	17 36 44.0	197 35 36.8	Cardwell.....	4.105426	12,747.5	41,822
		67 03 45.4	246 58 23.7	Hallinan.....	4.301856	20,038.1	65,742
Tivoli, Lutheran Church spire, 1931.....	28 27 35.889	358 16 17.3	178 16 28.0	Cardwell.....	4.309173	20,378.5	66,858
	96 53 11.682	41 05 32.0	221 01 27.9	Hallinan.....	4.327873	21,275.2	69,800
		107 04 41.7	287 02 13.2	Fagan.....	3.947668	8,864.8	29,084
Tivoli, Tivoli Gin Co., tank, 1931.....	28 27 24.663	358 24 10.1	178 24 19.8	Cardwell.....	4.301712	20,031.4	65,720
	96 53 09.616	41 49 33.8	221 45 28.8	Hallinan.....	4.323323	21,053.4	69,073
		210 08 54.7	30 10 53.4	Welder.....	4.128439	13,441.2	44,098
Austin, 1911 ¹	28 22 42.33	94 52 34	274 52 32	Austwell.....	2.097615	125.2	411
	96 49 33.30						
Terry reference mark, 1911.....	28 25 00.165	310 04 49.99	130 05 54.80	Swan reference mark.....	3.6855540	4,847.90	15,905.2
	96 44 52.307	61 27 12.41	241 24 56.59	Austwell.....	3.9470209	8,851.58	29,040.6
		228 35 59.23	48 37 48.07	Roemer.....	3.9184528	8,288.06	27,191.7
Swan reference mark, 1911.....	28 23 18.750	84 30 17.13	264 26 56.60	Austwell.....	4.0621376	11,538.19	37,854.9
	96 42 36.058	196 16 10.32	16 16 54.25	Roemer.....	3.9523294	8,960.44	29,397.7
Seadrift, Methodist Church steeple, 1931 ¹	28 24 35.52	72 58 15	252 54 57	Austwell.....	4.073468	11,843.2	38,856
	96 42 41.98	203 10 55	23 11 42	Roemer.....	3.831633	6,786.3	22,265
Port Lavaca municipal tank, 1931.....	28 36 51.709	18 56 01.6	198 54 22.6	Roemer.....	4.239628	17,363.1	56,965
	96 37 36.691	144 12 16.3	324 10 28.6	Wilson.....	4.018025	10,423.8	34,199
		310 07 38.9	130 09 25.0	Magnolia.....	3.896560	7,880.6	25,855
Port Lavaca High School cupola, 1931.....	28 36 50.112	19 17 12.0	199 15 31.3	Roemer.....	4.239251	17,348.1	56,916
	96 37 33.160	143 56 16.3	323 54 28.8	Wilson.....	4.022011	10,519.9	34,514
		310 18 23.1	130 20 07.5	Magnolia.....	3.890734	7,775.6	25,510
Edna, tank, 1931 ¹	28 58 40.21	327 08 31	147 11 34	Lolita.....	4.276687	18,909.8	62,040
	96 38 54.43	7 08 20	187 07 09	Wilson.....	4.506203	32,077.7	105,242
La Ward municipal tank, 1931 ¹	28 50 39.99	267 36 37	87 39 44	Francitas.....	4.021122	10,498.4	34,444
	96 27 50.46	81 53 38	261 51 20	Lolita.....	3.893133	7,818.7	25,652
Well Point 2, 1906.....	28 38 43.716	124 05 35.54	304 03 05.49	Slaikau.....	4.0107761	10,251.23	33,632.6
	96 18 09.345	232 51 55.36	52 54 20.54	Palacios south base.....	4.0129199	10,301.96	33,799.0
Well Point, 1866.....	28 38 31.242	133 10 43.34	313 08 47.90	Slaikau.....	3.9521562	8,956.87	29,386.0
	96 19 21.466	237 00 02.04	57 03 01.81	Palacios south base.....	4.0837528	12,126.98	39,786.6
		258 54 12.76	78 54 47.33	Well Point 2.....	3.3001706	1,996.05	6,548.7

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
County boundary monument, 1931.....	28 40 31.330	110 36 25.28	290 34 30.91	Slaiken.....	3.8394791	6,910.02	22,670.6
	96 19 23.811	328 35 45.45	148 36 21.17	Well Point 2.....	3.5889767	3,881.30	12,733.9
		359 00 46.38	179 00 47.51	Well Point.....	3.5679036	3,697.46	12,130.7
Camp Hulén, tank, 1931.....	28 41 48.182	90 17 56.3	270 13 50.0	Slaiken.....	4.143753	13,923.6	45,681
	96 14 49.157	147 32 55.6	327 29 45.8	Francitas.....	4.299300	19,920.5	65,356
		259 02 48.0	79 03 37.2	Palacios south base.....	3.451872	2,830.6	9,287
Palacios High School cupola, 1931.....	28 42 33.550	85 31 03.9	265 26 06.0	Slaiken.....	4.227692	16,892.4	55,421
	96 13 01.688	179 45 22.1	359 45 20.9	Palacios north base.....	4.183437	15,255.9	50,052
		9 08 13.5	189 08 11.1	Palacios south base.....	2.939617	870.2	2,855
Palacios municipal tank, 1931.....	28 42 11.367	51 27 15.7	231 27 11.8	Palacios south base.....	2.451495	282.8	928
	96 12 58.629	179 28 07.2	359 28 04.5	Palacios north base.....	4.202470	15,939.3	52,294
		220 52 41.1	40 56 50.8	Clapper.....	4.332135	21,485.0	70,489
Bay City municipal tank, 1931 ¹	28 58 55.00	305 06 06	125 08 12	Steinmeyer.....	3.933169	8,573.7	28,129
	95 57 57.49	329 48 47	149 52 17	Poole.....	4.371298	23,512.5	77,141
Wadsworth, Rougley Gin Co., tank, 1931 ¹	28 49 58.26	293 27 26	113 30 01	Poole.....	3.980114	9,552.4	31,340
	95 56 04.67	12 08 09	192 07 10	Matagorda longitude station.....	4.199571	15,833.3	51,946
Poole Cattle Co., northwest silo, 1931 ¹	28 49 42.59	310 55 40	130 56 48	Poole.....	3.705184	5,072.1	16,641
	95 53 02.85	28 51 43	208 49 17	Matagorda longitude station.....	4.233537	17,121.3	56,172
Poole Cattle Co., southeast silo, 1931 ¹	28 49 41.61	310 43 57	130 45 05	Poole.....	3.702909	5,045.6	16,554
	95 53 02.52	28 56 13	208 53 46	Matagorda longitude station.....	4.232970	17,099.0	56,099
Gulf Sulphur Works, black tank, 1931 ¹	28 44 29.94	53 53 05	233 50 54	Matagorda longitude station.....	3.959554	9,110.7	29,891
	95 53 36.17	216 55 13	36 56 37	Poole.....	3.896728	7,883.7	25,865
Gulf municipal tank, 1931.....	28 43 36.745	63 39 48.5	243 37 35.0	Matagorda longitude station.....	3.924936	8,412.7	27,601
	95 53 29.554	209 50 54.1	29 52 14.9	Poole.....	3.961646	9,154.7	30,035
		247 54 02.7	68 00 53.7	Pierce.....	4.397879	24,996.5	82,009
Kenner, 1853.....	28 48 57.635	319 15 12.57	139 15 20.19	Pierce.....	2.8176259	657.092	2,155.81
	95 39 31.257						
Brian Mound, Freeport Sulphur Co., tank, 1931.....	28 54 53.338	145 18 47.9	325 17 33.6	Jones.....	3.863643	7,305.4	23,968
	95 22 35.701	196 45 11.2	16 46 25.4	Pharr.....	4.157528	14,372.4	47,153
		244 45 22.4	64 48 00.0	Well.....	3.989012	9,750.2	31,989
Freeport municipal tank, 1931.....	28 57 02.803	105 51 55.9	285 49 48.6	Jones.....	3.869172	7,399.0	24,275
	95 20 46.386	186 54 42.9	6 55 04.1	Pharr.....	3.993324	9,847.5	32,308
		268 19 58.0	88 21 42.8	Well.....	3.767997	5,861.3	19,230
East Freeport, Stafford Chemical Co., tank, 1931.....	28 56 55.376	105 37 12.6	285 34 48.6	Jones.....	3.922396	8,363.7	27,440
	95 20 11.755	181 25 13.5	1 25 18.0	Pharr.....	4.000328	10,007.6	32,833
		265 22 03.8	85 23 31.9	Well.....	3.693480	4,937.2	16,198
Brazos River Lighthouse, 1897.....	28 56 41.559	103 55 26.7	283 52 13.4	Jones.....	4.046714	11,135.6	36,534
	95 18 30.051	115 38 47.0	295 31 22.7	Brazoria.....	4.439397	27,504.1	90,236
		166 30 06.8	346 29 21.9	Pharr.....	4.030455	10,726.4	35,192
West 2 (U.S.E.), 1912.....	28 55 48.936	112 05 10.36	292 02 00.93	Jones.....	4.0582276	11,434.77	37,515.6
	95 18 37.906	169 14 04.77	349 13 23.73	Pharr.....	4.0887038	12,266.02	40,242.8
		224 14 38.68	44 15 21.21	Well (U.S.E.).....	3.5328500	3,410.75	11,190.1
Well (U.S.E.), 1912.....	28 57 08.294	98 09 09.67	278 05 17.62	Jones.....	4.1175200	13,107.50	43,003.5
	95 17 10.027	154 04 57.10	334 03 33.44	Pharr.....	4.0286564	10,682.09	35,046.2
Brazoria, old courthouse steeple, 1931.....	29 03 12.668	303 57 57.7	124 02 06.5	Jones.....	4.224002	16,749.5	54,952
	95 33 42.329	51 51 46.2	231 49 51.6	Woosley.....	3.910019	8,128.7	26,669
		34 57 51.8	214 57 49.7	Brazoria.....	2.299700	199.4	654
Angleton municipal tank, 1931.....	29 06 52.884	324 59 42.2	145 02 37.6	Pharr.....	4.230562	17,004.4	55,789
	95 26 03.107	356 09 13.3	176 09 39.5	Jones.....	4.337193	21,736.7	71,314
		27 47 20.3	207 47 07.1	Angleton.....	3.196317	1,571.5	5,156
Hoskins Mound, Freeport Sulphur Co., west tank, 1931.....	29 08 13.700	259 27 30.7	79 27 49.4	Hoskins.....	3.024009	1,056.8	3,467
	95 14 17.414	40 39 17.9	220 36 30.1	Pharr.....	4.156395	14,334.9	47,030
		135 49 33.4	315 46 31.0	Danbury.....	4.161405	14,501.2	47,576
Hoskins Mound, Freeport Sulphur Co., stack, 1931.....	29 08 12.702	256 56 03.6	76 56 20.9	Hoskins.....	2.996182	991.2	3,252
	95 14 14.698	40 57 27.1	220 54 37.9	Pharr.....	4.157143	14,559.6	47,111
		135 42 12.8	315 39 09.0	Danbury.....	4.163593	14,574.5	47,817
Hoskins Mound, Freeport Sulphur Co., east tank, 1931.....	29 08 12.882	41 13 29.8	221 10 39.0	Pharr.....	4.159130	14,425.5	47,328
	95 14 11.227	135 25 33.4	315 22 28.0	Danbury.....	4.165429	14,636.2	48,019
		167 34 01.4	347 32 50.8	Liverpool.....	4.258140	18,119.2	59,446
San Luis Coast Guard Station, cupola, 1931.....	29 06 48.725	101 17 47.2	281 13 33.2	Hoskins.....	4.157959	14,386.6	47,200
	95 04 57.052	173 09 31.8	353 08 56.3	Hughes.....	4.217485	16,500.0	54,134
		160 38 18.8	340 38 09.4	Life.....	3.197658	1,576.4	5,172
Life, 1912.....	29 07 37.032	95 35 33.61	275 31 28.93	Hoskins.....	4.1351438	13,650.35	44,784.5
	95 05 16.384	174 27 53.02	354 27 26.94	Hughes.....	4.1750787	14,965.07	49,097.9
		234 42 30.40	54 43 51.86	Snake.....	3.7433751	5,538.28	18,170.2

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Snake, 1912	29 09 20.931	84 07 40.54	264 02 14.28	Hoskins	4.2601213	18,202.09	59,718.0
	95 02 29.121	153 00 14.85	332 58 27.13	Hughes	4.1182137	13,128.46	43,072.3
Fort Crockett, aerial beacon (Aero, 1931), 1931 ¹	29 16 08.45	88 10 45	268 02 58	Hughes	4.412149	25,831.5	84,749
	94 50 13.56	114 13 10	294 05 46	Alta Loma	4.428666	26,832.8	88,034
Bolivar Point Lighthouse (U.S.E.), 1900	29 21 59.597	148 41 59.7	328 35 31.1	Morgan Point 2	4.610851	40,817.9	133,917
	94 46 00.263	165 04 39.8	345 01 43.3	Beazley	4.572697	37,385.0	122,654
		190 42 55.8	10 45 10.5	Scherer	4.596738	39,512.8	129,635
Alvin, Gulf Utilities Co., tank, 1931	29 25 28.410	292 16 01.9	112 20 39.6	Alta Loma	4.217227	16,490.2	54,102
	95 14 46.712	11 43 11.5	191 42 18.0	Liverpool	4.161060	14,489.7	47,538
		351 04 06.5	171 04 11.5	Alvin	3.249957	1,778.1	5,834
Galveston Water & Power Co., tallest stack, 1931	29 22 07.506	11 57 41.7	191 56 56.0	Hughes	4.085242	12,168.6	39,923
	95 04 36.437	105 20 58.2	285 16 03.8	Alvin	4.224668	16,775.2	55,037
		86 30 05.1	266 29 43.4	Alta Loma	3.079587	1,201.1	3,941
Texas City, Knox Refining Co., tank, 1931	29 22 40.034	86 12 55.0	266 08 02.6	Alta Loma	4.207119	16,110.9	52,857
	94 55 24.838	128 58 03.6	308 53 39.4	Dickinson	4.270182	18,628.7	61,118
		149 25 29.1	329 21 46.1	Peden	4.379831	23,979.0	78,671
Dickinson Ice & Fuel Co., tank, 1931	29 27 47.557	17 30 42.5	197 29 41.9	Alta Loma	4.043553	11,054.9	36,269
	95 03 17.552	71 46 38.7	251 41 05.1	Alvin	4.284880	19,269.9	63,221
		141 59 34.1	321 59 02.2	Dickinson	3.453353	2,840.2	9,318
League City, powerhouse tank, 1931	29 30 39.648	313 59 11.8	134 00 09.7	Dickinson	3.644094	4,406.5	14,457
	95 06 20.157	354 14 16.7	174 14 45.8	Alta Loma	4.201993	15,921.8	52,237
		49 44 26.0	229 40 21.8	Alvin	4.243878	17,533.9	57,526
J. M. West Estate, tank, 1931	29 33 34.527	259 51 01.3	79 51 51.2	Peden	3.442108	2,767.6	9,080
	95 04 39.163	356 57 06.6	176 57 14.8	Dickinson	3.927216	8,457.0	27,746
		81 29 01.4	261 24 50.2	Eignus	4.141949	13,865.9	45,492
South Houston, airway beacon, white light, 1931	29 38 57.802	220 32 13.8	40 34 25.1	Buffalo	4.039639	10,955.7	35,944
	95 17 10.468	245 35 01.2	65 39 39.7	Shell	4.220129	16,600.8	54,464
		289 59 45.6	110 02 16.2	Genoa	3.940467	8,719.0	28,606

Pearland, black tank, 1931 ¹	29 39 49.40	160 22 48	340 22 04	Maid	3.842844	6,963.8	22,847
	95 14 23.49	201 20 57	21 21 45	Buffalo	3.859248	7,231.8	23,726
Shoreacres, black tank, 1931	29 37 10.785	27 43 35.6	207 42 36.1	Peden	3.843295	6,971.0	22,871
	95 00 57.473	132 36 29.1	312 33 05.9	Shell	4.175994	14,996.6	49,201
		203 12 58.2	23 13 51.9	Morgan Point 2	3.869386	7,402.6	24,287
La Porte municipal tank, 1931	29 39 52.523	243 11 11.9	63 12 18.3	Morgan Point 2	3.606660	4,042.6	13,263
	95 01 23.128	12 53 39.7	192 52 52.8	Peden	4.058390	11,439.1	37,530
		116 33 21.5	296 30 10.8	Shell	4.063274	11,568.4	37,954
La Porte, Catholic College, stack, 1931 ¹	29 39 15.69	118 22 20	298 18 45	Shell	4.122978	13,273.3	43,547
	95 00 33.61	217 35 19	37 36 01	Morgan Point 2	3.571964	3,732.2	12,245
Houston, Houston Power & Light Co., tank, 1931 ¹	29 43 16.94	117 03 48	297 02 05	Port	3.795534	6,245.0	20,489
	95 13 31.44	194 11 00	14 11 24	Cullinan	3.720267	5,251.3	17,229
Houston, Gulf Building flagpole, 1931	29 45 31.132	279 22 43.4	99 25 07.6	Port	3.898244	7,911.2	25,955
	95 21 48.899	266 12 58.9	86 17 29.7	Cullinan	4.166806	14,682.7	48,171
		292 20 24.9	112 23 22.6	Maid	4.017637	10,414.5	34,168
Houston, Esperson Building dome, 1931	29 45 30.984	279 12 34.4	99 15 00.7	Port	3.904506	8,026.1	26,332
	95 21 53.261	284 22 24.6	104 26 56.3	Buffalo	4.181745	15,196.5	49,857
		292 04 26.5	112 07 26.4	Maid	4.022066	10,521.2	34,518
Noffke, 1931	29 46 17.935	253 50 55.63	73 53 23.88	San Jacinto	3.9214543	8,345.54	27,380.3
	95 08 22.304	352 11 12.22	172 11 29.19	Shell	3.8300998	6,762.38	22,186.2
		290 05 06.04	110 08 26.38	Davis (U.S.E.)	4.0626060	11,550.64	37,895.7
Cullinan, 1931	29 46 02.288	266 03 17.88	86 05 27.59	Noffke	3.8472326	7,034.49	23,079.0
	95 12 43.545	308 02 50.84	128 05 17.40	Shell	4.0036432	10,084.24	33,084.7
Buffalo, 1931	29 43 28.148	180 38 35.08	0 38 36.07	Cullinan	3.6763528	4,746.27	15,571.7
	95 12 45.528	233 30 44.42	53 32 55.03	Noffke	3.9442385	8,795.05	28,855.1
		280 24 43.82	100 27 11.27	Shell	3.9100101	8,128.49	26,668.2
Port, 1931	29 44 49.173	251 47 00.22	71 49 06.72	Cullinan	3.8578193	7,208.08	23,648.5
	95 16 58.409	290 08 28.46	110 10 33.89	Buffalo	3.8596864	7,239.13	23,750.4
Grain, 1931	29 44 49.219	331 35	151 35	Port	0.2081725	1.615	5.30
	95 16 58.438						
Maid, 1931	29 43 22.430	145 39 22.06	325 38 48.37	Port	3.5098630	3,234.92	10,613.2
	95 15 50.489	225 34 13.59	45 35 46.34	Cullinan	3.8471262	7,032.77	23,073.3
		267 57 32.07	87 59 03.77	Buffalo	3.6967212	4,974.18	16,319.5
Flour, 1931	29 43 22.332	225 32	45 32	Maid	0.634477	4.310	14.14
	95 15 50.603						

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued							
Pasadena, 1931.....	29 42 45.294	102 47 56.9	282 46 24.0	Maid.....	3.713200	5,166.5	16,950
	95 12 43.033	179 52 11.9	359 52 11.6	Cullinan.....	3.782865	6,065.5	19,900
		177 05 25.4	357 05 24.2	Buffalo.....	3.120964	1,321.2	4,335
Chim, 1931.....	29 43 33.449	13 19 17.2	193 19 10.1	Shell.....	3.225396	1,680.3	5,513
	95 07 33.699	165 32 36.1	345 32 12.0	Noffke.....	3.718518	5,230.2	17,159
		263 26 37.4	83 29 33.6	Davis (U.S.E.).....	3.982489	9,604.8	31,512
Channel City, standpipe, 1931.....	29 44 20.469	186 35 40.1	6 35 47.8	Noffke.....	3.561205	3,640.9	11,945
	95 08 37.869	336 32 34.7	156 32 59.4	Shell.....	3.526404	3,360.5	11,025
		76 24 37.9	256 22 35.0	Buffalo.....	3.835550	6,847.8	22,466
KTRH Broadcasting Station, east tower, 1931.....	29 42 39.388	98 26 56.0	278 24 11.0	Maid.....	3.956367	9,044.1	26,972
	95 10 17.633	110 42 02.3	290 40 48.9	Buffalo.....	3.628302	4,249.1	13,941
		269 34 14.1	89 35 28.2	Shell.....	3.604161	4,019.4	13,187
Baytown, silver water tank, 1931.....	29 43 49.173	339 43 10.6	159 43 47.7	Morgan Point 2.....	3.765244	5,824.3	19,109
	95 00 24.025	106 53 22.4	286 52 45.4	Davis (U.S.E.).....	3.321180	2,095.0	6,873
		145 00 41.5	324 59 12.2	San Jacinto.....	3.925427	8,422.2	27,632
Baytown, Humble Refinery stack, 1931.....	29 44 27.52	343 22 40	163 24 17	Morgan Point 2.....	3.840916	6,932.9	22,746
	95 00 22.63	74 37 17	254 33 36	Shell.....	4.094078	12,418.8	40,744
Baytown, northeast transmission tower, 1931.....	29 43 50.359	78 01 26.7	257 58 19.7	Shell.....	4.015655	10,367.0	34,012
	95 01 30.812	156 08 20.5	336 07 24.4	San Jacinto.....	3.875311	7,504.3	24,620
		325 15 11.1	145 16 21.5	Morgan Point 2.....	3.825604	6,692.7	21,958
Baytown, southwest transmission tower, 1931.....	29 43 40.144	79 28 17.3	259 25 15.1	Shell.....	4.002285	10,052.8	32,982
	95 01 40.407	158 50 29.1	338 49 37.8	San Jacinto.....	3.886276	7,696.2	25,250
		321 51 02.3	141 52 17.5	Morgan Point 2.....	3.819076	6,592.9	21,630
Goose Creek municipal tank, 1931.....	29 43 52.097	128 31 53.3	308 29 15.2	San Jacinto.....	4.038842	10,935.6	35,878
	94 58 05.326	293 28 56.1	113 31 58.0	Beazley.....	4.031689	10,756.9	35,292
		17 07 09.5	197 06 38.0	Morgan Point 2.....	3.764234	5,810.8	19,064
Pelly municipal tank, 1931.....	29 43 21.302	287 29 13.2	107 32 28.4	Beazley.....	4.045583	11,106.6	36,439
	94 58 32.377	12 03 03.3	192 02 45.2	Morgan Point 2.....	3.672928	4,709.0	15,449
		85 12 44.0	265 08 08.7	Shell.....	4.175800	14,989.9	49,179
Morgan Point (U.S.E.), 1901.....	29 40 51.529	149 19 48	329 19 48	Morgan Point 2.....	0.860038	7.245	23.77
	94 59 08.805						
Cedar Point (U.S.E.), 1900.....	29 40 10.674	96 51 57.3	276 48 43.3	Morgan Point 2.....	4.025956	10,615.9	34,829
	94 52 36.949	202 19 39.7	22 19 58.8	Beazley.....	3.436451	2,731.8	8,963
		253 46 08.4	73 51 40.2	Scherer.....	4.273149	18,756.4	61,537
Anahuac, courthouse dome, 1931.....	29 46 08.234	64 15 04.1	244 09 40.3	Beazley.....	4.289889	19,493.5	63,955
	94 41 05.261	171 58 07.0	351 57 39.7	Collins.....	4.023210	10,549.0	34,610
		5 45 09.8	185 44 59.0	Scherer.....	3.764201	5,810.3	19,063
Robinson Bayou (U.S.E.), 1900.....	29 34 43.296	157 18 09.38	337 16 11.09	Moon.....	4.2216031	16,657.24	54,649.6
	94 33 56.937	229 10 28.77	49 16 08.88	Winnie south base.....	4.3877171	24,418.39	80,112.7
Highland 2, 1872.....	29 33 51.302	95 17 39.36	275 12 19.93	Robinson Bayou (U.S.E.).....	4.2429328	17,495.76	57,400.7
	94 23 09.667	125 29 45.92	305 22 27.55	Moon.....	4.4663205	29,263.11	96,007.4
		183 31 31.32	3 31 51.22	Winnie south base.....	4.2450836	17,582.62	57,685.6
Northwest Bend, 1861.....	29 34 39.373	90 31 04.09	270 26 40.35	Robinson Bayou (U.S.E.).....	4.1578104	14,381.71	47,184.0
	94 25 02.616	194 22 09.05	14 23 24.83	Winnie south base.....	4.2198181	16,588.92	54,425.5
		295 57 01.95	115 57 57.69	Highland 2.....	3.5290936	3,381.38	11,093.7
Beaumont, Beaumont Hotel, letter "T" in "Hotel", 1931.....	30 04 53.619	269 55 29.9	89 58 37.2	Stephenson.....	4.000353	10,008.1	32,835
	94 05 52.535	14 24 14.4	194 24 00.7	Beaumont.....	3.467526	2,934.4	9,627
		72 45 56.8	252 42 16.0	Amelia.....	4.092090	12,362.0	40,558
Beaumont, Tyrrell Rice Co., tank, 1931.....	30 04 33.449	1 38 06.8	181 38 05.6	Beaumont.....	3.346762	2,222.1	7,290
	94 06 17.418	74 43 33.1	254 40 04.8	Amelia.....	4.062518	11,548.3	37,888
		81 56 51.3	261 49 31.8	China.....	4.375380	23,734.5	77,869
Beaumont, terminal docks, municipal tank, 1931.....	30 04 45.780	121 03 30.8	300 59 46.1	Perl.....	4.146002	13,995.9	45,918
	94 05 17.142	6 59 19.7	156 58 44.5	Hebert.....	4.190674	15,512.2	50,893
		268 23 46.9	88 26 36.5	Stephenson.....	3.957312	9,063.8	29,737
Port Neches, black tank, 1931.....	29 59 28.071	356 06 54.9	176 07 01.2	Doornbos.....	3.699689	5,008.3	16,431
	93 57 09.634	158 17 14.5	338 15 59.8	Stephenson.....	4.033407	10,799.6	35,432
		256 07 49.6	78 11 02.1	Dunn.....	4.023060	10,545.3	34,597
Nederland (U. S. E.), 1911.....	29 58 44.190	314 23 54.9	134 25 04.2	Doornbos.....	3.716820	5,209.8	17,092
	93 59 15.788	69 48 43.8	219 45 08.2	Hebert.....	4.091181	12,336.2	40,473
		176 53 53.3	356 53 41.8	Stephenson.....	4.056924	11,400.5	37,403
Port Arthur, Goodhue Hotel, tower, 1931.....	29 52 21.978	114 19 18.7	294 14 09.4	Hebert.....	4.261341	13,253.3	59,886
	93 56 07.302	170 41 09.0	350 40 44.2	Doornbos.....	3.915484	8,231.6	27,007
		209 30 02.2	29 32 43.3	Dunn.....	4.244638	17,564.6	57,627
Port Arthur, Gulf Refining Co., tallest stack, 1931.....	29 51 57.147	121 36 17.5	301 32 07.4	Hebert.....	4.198552	15,796.2	51,825
	93 58 05.872	191 44 33.3	11 45 07.7	Doornbos.....	3.957977	9,077.7	29,782
		216 22 39.7	36 26 20.0	Dunn.....	4.299744	19,940.9	65,423
Port Arthur, Texas Oil Co. docks, water tower, 1931.....	29 50 36.007	126 16 02.4	306 11 29.4	Hebert.....	4.260543	18,219.8	59,776
	93 57 19.761	183 04 15.8	3 04 27.2	Doornbos.....	4.056992	11,402.3	37,409
		209 43 19.1	29 46 36.3	Dunn.....	4.329648	21,362.3	70,086

1 No check on this position.

Gulf Coast arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance			
					Logarithm (meters)	Meters	Feet	
Supplementary points—Continued								
Primary traverse station no. 63M (U.S.G.S.), 1931. ¹	29 56 49.32 93 56 58.27	342 20 07	162 20 08	Doornbos.....	2.056470	113.886	373.64	
Spur (U.S.E.), 1909 ¹	29 56 44.44 93 56 57.49	198 08 14	18 08 15	Doornbos.....	1.642078	43.861	143.90	
Neches River, east power-line tower, 1931.....	30 03 21.788 94 01 43.336	30 45 14.6 89 54 21.9 229 36 43.8	210 42 52.5 269 52 03.5 49 37 46.2	Hebert..... Beaumont..... Stephenson.....	4.173310 3.869543 3.641262	14,904.2 7,405.3 4,377.9	48,898 24,296 14,363	
Neches River, west power-line tower, 1931.....	30 03 21.775 94 01 52.426	29 56 33.0 89 54 17.5 231 35 13.1	209 54 15.4 269 52 03.6 51 36 20.0	Hebert..... Beaumont..... Stephenson.....	4.169700 3.855024 3.659563	14,780.9 7,161.8 4,566.3	48,494 23,497 14,981	
Orange, Gulf States Utilities Co., standpipe, 1931.	30 05 26.950 93 43 46.294	51 36 42.9 170 15 16.0 248 53 44.7	231 33 13.4 350 14 36.5 68 57 42.6	Dunn..... Reese..... Ged.....	4.155358 4.094495 4.133689	14,300.7 12,430.7 13,604.7	46,918 40,783 44,635	
Orange, Presbyterian Church dome, pin- nacle, 1931. ¹	30 05 35.70 93 44 16.70	251 04 40 346 38 50	71 08 53 166 38 52	Ged..... Orange.....	4.154658 2.677205	14,277.7 475.6	46,843 1,560	
Orange, Sabine Packing Co., tank, 1931 ¹	30 04 53.98 93 48 30.03	263 10 52 24 36 43	83 13 00 204 35 36	Orange..... Dunn.....	3.841521 3.937354	6,942.6 8,656.7	22,778 28,401	
Orange, Yellow Pine Paper Co., tank, 1931....	30 05 18.745 93 44 42.316	250 02 37.7 265 43 30.0 48 21 58.0	70 07 03.8 85 43 44.9 228 18 56.6	Ged..... Orange..... Dunn.....	4.178928 2.901977 4.113566	15,098.3 798.0 12,988.7	49,535 2,618 42,614	
Orange, Orange Rice Mill Co., tank, 1931.....	30 05 17.154 93 44 06.749	172 55 45.3 208 39 46.6 248 33 14.2	352 55 16.1 28 42 41.0 68 37 22.4	Reese..... Vinton..... Ged.....	4.102057 4.286613 4.153040	12,649.0 19,347.0 14,224.6	41,499 63,474 46,669	
Orange, Orange Canning Plant, tank, 1931.....	30 05 06.657 93 44 59.552	251 02 53.4 48 13 55.7 179 21 23.1	71 03 16.9 228 11 02.9 359 21 20.4	Orange..... Dunn..... Reese.....	3.123640 4.093298 4.109807	1,329.4 12,396.5 12,876.8	4,362 40,671 42,247	

¹ No check on this position.

DESCRIPTIONS OF TRIANGULATION STATIONS

The following descriptions of stations may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360° , south being 0° , west 90° , north 180° , and east 270° . Where magnetic azimuths are given they are indicated as such.

In general, except where the contrary is specifically stated, the surface and underground marks are not in contact, so that a disturbance of the surface mark will not necessarily affect the underground mark. The underground mark should be resorted to only in cases where there is evidence that the surface mark has been disturbed.

The name and dates given in each description immediately after the county refer to the chief of party by whom the station was established, the date of the establishment of the station, and the date when the station was last recovered.

Any person who finds that one of the stations herein described has been disturbed or that the description no longer fits the facts is requested to send such information to the Director, United States Coast and Geodetic Survey, Washington, D.C.

MARKING OF STATIONS

The standard disk station and reference marks referred to in the following descriptions and notes consist of a disk and shank of brass cast in one piece, as shown in figure 4. The disk of the station mark is 90 millimeters in diameter, with a hole at the center surrounded by a 20-millimeter equilateral triangle, and has the following inscribed legend: "U.S. Coast and Geodetic Survey Triangulation Station. For information write to the Superintendent, Washington, D.C. \$250 fine or imprisonment for disturbing this mark." On the new marks made since March 1921 the word "Director" replaces the word "Superintendent" in the inscription. The shank is 25 millimeters in diameter and 80 millimeters long, with a slit at the lower end into which a wedge is inserted, so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place. The marks used between about 1915 and 1920 have grooves cut around the shank instead of the slit.

The old type of station mark referred to in the following notes and descriptions consists also of a disk and shank made of bronze and cast in one piece. The disk, which is somewhat smaller than the disk of the marks described above, has a polished center with an inscribed triangle. Around the polished part are the letters "U.S. C. & G. S." and a raised flange around the edge.

The standard disk reference mark, shown in figure 4, is the same size and shape as the newer type of station mark, described above, but instead of a triangle it has an arrow at the center of the disk, which, when the mark is properly set, points to the station. The legend is the same as for the station mark except that the words "reference mark" take the place of the words "triangulation station."

The standard note on the marking of stations which are given below serve as a guide to the field observer in selecting the best type of mark for each particular station. They are also useful to the observer in writing his descriptions, as he need not describe the marking used at a station but simply give the numbers of the standard notes which

describe the station, underground, reference, and witness marks. The notes are made as general as possible in order that it might not be necessary in the field to describe small and unimportant details.

At the end of the standard notes are given a number of additional notes, describing marks which were largely used before the adoption of the standard disk station and reference marks. These vary to a great extent with the locality, depending somewhat on the character of the material available for the construction of permanent marks.

For the convenience of the reader a brief description of the marking is given in each of the following descriptions of stations. In addition, the number of the note describing the mark in detail is also given.

STANDARD NOTES ON THE MARKING OF STATIONS

Surface marks

Note 1.—A standard disk triangulation station mark set in the top of (a) a square block or post of concrete, (b) a concrete cylinder, (c) an irregular mass of concrete.

Note 2.—A standard disk triangulation station mark wedged in a drill hole in outcropping bedrock (a) and surrounded by a triangle chiseled in the rock, (b) and surrounded by a circle chiseled in the rock, (c) at the intersection of two lines chiseled in the rock.

Note 2A.—Old type bronze disk cemented into drill hole in solid rock.

Note 3.—A standard disk triangulation station mark set in concrete in a depression in outcropping bedrock.

Note 4.—A standard disk triangulation station mark wedged in a drill hole in a boulder.

Note 5.—A standard disk triangulation station mark set in concrete in a depression in a boulder.

Note 6.—A standard disk triangulation station mark set in concrete at the center of the top of a tile (a) which is embedded in the ground, (b) which is surrounded by a mass of concrete, (c) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (d) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Underground marks

Note 7.—A block of concrete 3 feet below the ground containing at the center of its upper surface (a) a standard disk triangulation station mark, (b) a copper bolt projecting slightly above the concrete, (c) an iron nail with the point projecting above the concrete, (d) a glass bottle with the neck projecting a little above the concrete, (e) an earthenware jug with the mouth projecting a little above the concrete.

Note 8.—In bedrock (a) a standard disk triangulation station mark wedged in a drill hole, (aa) old type station disk, (b) a standard bronze tablet set in concrete in a depression, (c) a copper bolt set in cement in a drill hole or depression, (d) an iron spike set point up in cement in a drill hole or depression.

Note 9.—In a boulder 3 feet below the ground (a) a standard disk triangulation station mark wedged in a drill hole, (b) a standard bronze tablet set in concrete in a depression, (c) a copper bolt set with cement in a drill hole or depression, (d) an iron spike set with cement in a drill hole or depression.

Note 10.—Embedded in earth 3 feet below the surface of the ground (a) a bottle in an upright position, (b) an earthenware jug in an upright position, (c) a brick in a horizontal position with a drill hole in its upper surface.

Reference marks

Note 11.—A standard disk reference mark with the arrow pointing toward the station set at the center of the top of (a) a square block or post of concrete, (b) a concrete cylinder, (c) an irregular mass of concrete.

Note 12.—A standard disk reference mark with the arrow pointing toward the station (a) wedged in a drill hole in outcropping bedrock, (b) set in concrete in a depression in outcropping bedrock, (c) wedged in a drill hole in a boulder, (d) set in concrete in a depression in a boulder,

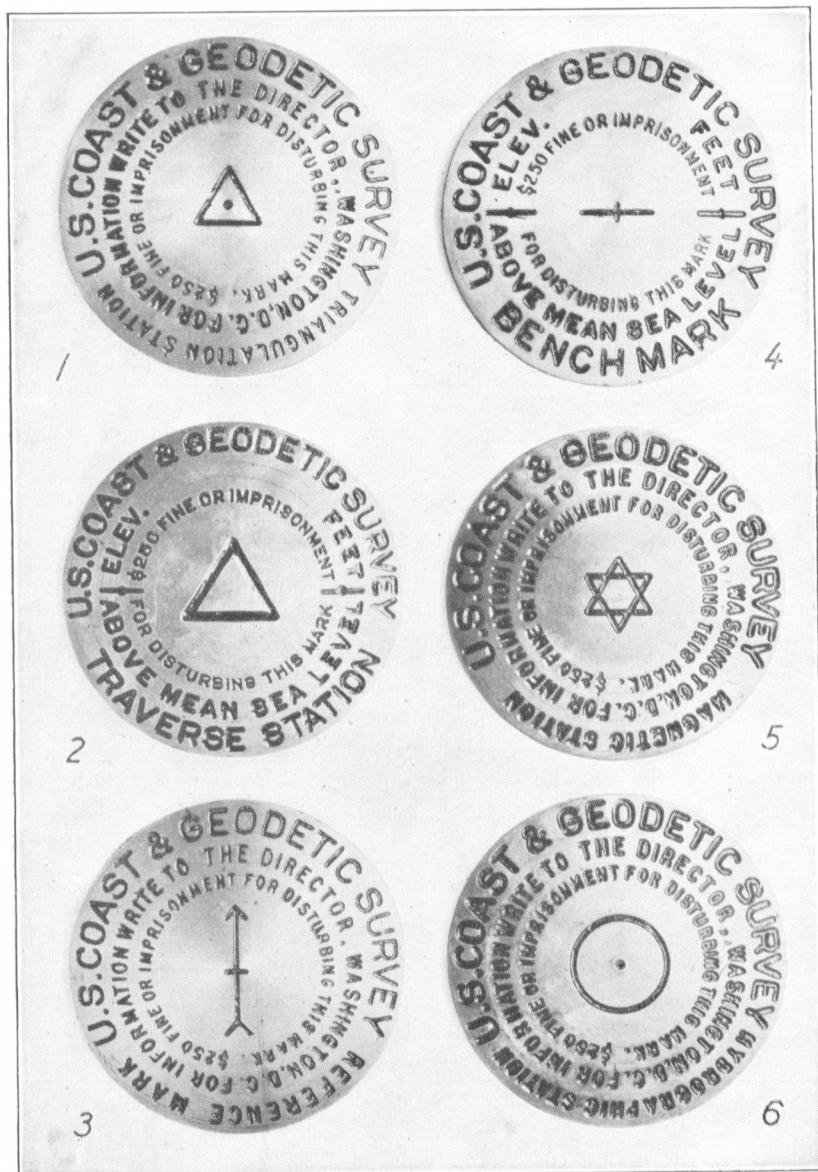


FIGURE 4.—STANDARD MARKS OF THE U.S. COAST AND GEODETIC SURVEY.

1. Triangulation station mark.
2. Traverse station mark.
3. Reference mark.

4. Bench mark.
5. Magnetic station mark.
6. Hydrographic station mark.

Note 13.—A standard disk reference mark with the arrow pointing toward the station, set in concrete at the center of the top of a tile (a) which is embedded in the ground, (b) which is surrounded by a mass of concrete, (c) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (d) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Witness marks

Note 14.—A conical mound of earth surrounded by a circular trench.

Note 15.—A tree marked with (a) a triangular blaze with a nail at the center and each apex of the triangle, (b) a square blaze with a nail at the center and each corner of the square, (c) a blaze with a standard disk reference mark set at its center into the tree.

ADDITIONAL NOTES ON THE MARKING OF STATIONS

Surface marks

Note 16.—A standard disk triangulation station mark set in center of top of cement post $2\frac{1}{2}$ feet long and $7\frac{1}{2}$ inches diameter, encased in a pipe of tin. Post projects about 2 inches above the ground.

Note 17.—A standard disk triangulation station mark set in cement post 6 inches square and 2 feet long encased in a wooden box. Post projects 2 to 6 inches above ground.

Note 18.—A nail projecting above the upper surface of a large cylinder or block of concrete into which are cut the letters U.S.C. & G.S. and the date.

Note 19.—A nail projecting from top of column of concrete about 2 feet long embedded in the ground.

Note 20.—A copper tack in top of a cedar stub which projects 6 to 18 inches above the ground.

Note 21.—A large nail projecting above the surface of concrete that fills an iron pipe $1\frac{1}{2}$ inches in diameter set in a cylinder of concrete 20 inches in diameter (a) pipe and concrete cylinder each 24 inches long, (b) length of pipe and cylinder depends upon depth of soil above solid rock.

Note 22.—A cap triangulation station mark screwed to the top of a 3-inch iron pipe 30 inches long which is (a) embedded in a cylinder of concrete 20 inches in diameter and 30 inches long, (b) set in the ground with earth and rock well tamped around it.

Note 23.—A cap triangulation station mark screwed to the top of a 3-inch iron pipe 2 feet long, which is anchored by means of an iron rod through a horizontal hole near bottom of pipe.

Note 24.—A nail in the center of a terra-cotta pipe 4 inches in diameter and 2 feet long, filled with concrete and set in a block or cylinder of concrete 18 inches in diameter. Top of concrete is sometimes marked with the letters U.S.C. & G.S. and the date.

Note 25.—An old style triangulation station mark (disk) set in a hard limestone block 23 inches square and 16 inches high, which in turn is embedded in a block of concrete 4 feet square and 4 feet deep.

Note 26.—A nail in the center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete, and surrounded by a block of concrete 18 inches in diameter. The concrete was marked with the letters U.S.C. & G.S. and the date.

Note 26A.—Witness points, witness corners, range-line stations, and section corners along the Oklahoma bluff of the Red River were marked with monuments constructed of iron posts, 36 inches long and 2 inches diameter, with bronze caps on top, placed full length in concrete in galvanized iron form 36 inches long, 8 inches upper diameter and 14 inches diameter at base, set 30 inches in the ground. Monuments are appropriately marked according to the standard specifications of the General Land Office.

Note 26B.—State boundary reference points along the Texas bluff of the Red River were marked with concrete monuments, molded in mass at station in galvanized iron forms 36 inches long, 16 inches upper diameter, 24 inches base diameter, set 30 inches in ground. Center of each monument is marked with heavy bronze disk bearing inscription of The Supreme Court of the United States, Texas and Oklahoma Boundary Commission, 1923.

Underground marks

Note 27.—A nail or small wooden plug set in a small quantity of cement 3 to 6 inches below the surface mark.

Note 28.—A piece of copper or lead set into a piece of coral rock 6 inches below the surface of the ground.

Note 29.—A nail projecting from a block of concrete set about 3 feet below the surface of the ground.

Note 30.—A spike projecting above concrete which fills a terra-cotta pipe 4 inches in diameter and 2 feet long, encased in a cylinder of concrete 12 inches in diameter. It is 6 inches below the surface mark.

Note 31.—A hole filled with lead in the center of the top of a concrete pyramid or coral rock buried 3 to 4 feet below the surface of the ground.

Note 32.—The point of a large nail 30 inches below the surface of the ground and projecting above the surface of the concrete that fills an iron pipe 1½ inches in diameter and 12 inches long and is embedded (a) in a cylinder of concrete 12 inches in diameter and 12 inches long, (b) in an irregular mass of concrete.

Note 33.—An old type station mark (disk) set in cement 2 feet below surface of ground.

Note 34.—A nail in the center of a terra-cotta pipe, 4 inches in diameter and 2 feet long, filled with concrete and set in a concrete block 1 foot in diameter. Mark is 2 feet below surface of ground.

Note 35.—A millimeter hole in top of a copper bolt set in a limestone block 6 inches square and 1 foot long, which in turn is set in concrete with top 4 feet below the surface of the ground. Between the limestone block forming the surface mark and top of underground mark is a terra-cotta pipe 7 inches in diameter and 25 inches long, partly embedded in concrete and covered with a piece of metal to protect the underground mark.

Note 36.—A nail in the center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete and surrounded by a concrete block 12 inches in diameter. The concrete may be marked with the letters U.S.C. & G.S. and the date.

Reference marks

Note 38.—A standard disk reference mark set in top of a concrete post 2½ feet long and 5½ or 7½ inches in diameter, encased in a pipe of tin. Post projects 6 inches above the ground.

Note 39.—A standard disk reference mark set in a cement post 6 inches square and 2 feet long encased in a wooden box. Post projects 2 to 6 inches above the ground.

Note 40.—A large nail projecting from the center of top of cylinder of concrete about 3 feet long.

Note 41.—A large spike projecting from the center of top of a terra-cotta sewer pipe, 4 inches in diameter and 2 feet long, filled with concrete and encased in a concrete cylinder about 12 inches in diameter.

Note 42.—The point of a large nail projecting above concrete that fills an iron pipe 1½ inches in diameter, set in a cylinder of concrete 12 inches in diameter; (a) pipe and cylinder are 24 inches in length; (b) lower end of pipe is cemented in hole in solid rock and lengths of pipe and concrete cylinder depend on depth of soil above rock.

Note 43.—A three-fourths inch iron rod 18 inches long set in a cylinder of concrete 12 inches in diameter and 20 inches long.

Note 44.—A nail in center of a terra-cotta pipe filled with concrete and set in a block of concrete 1 foot in diameter.

Note 45.—A nail in center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete and set in a concrete block 12 inches in diameter.

Note 46.—A ½-inch to ¾-inch drill hole, 1 to 2 inches deep surrounded by a triangle.

Witness marks

Note 47.—Trenches about 1½ feet deep and 2 feet wide extend north, east, south, and west from the station.

Note 48.—Four stubs, usually of cedar, were placed around the station at distances of 4 to 6 feet.

NINETY-EIGHTH MERIDIAN ARC

Principal points

Monument (Jefferson County, Okla., O. W. Ferguson, 1902; 1923).—About 3 miles east of Addington, on what is known as Monument Hill, 35 meters (115

feet) N. 8° E. of and 4.8 feet lower than highest rock on hill, 146.3 meters (480 feet) N. 80° E. of highest rock in ledge forming western support of hill, and 4.85 meters (15.9 feet) east of prolongation of north-and-south fence that joins the east-and-west fence at station, on land owned in 1923 by Henry Price of Addington. Surface and underground marks were nails in terra-cotta pipes filled with and set in concrete, notes 24 and 34. In 1923 standard station disk was substituted for nail in surface mark, note 6 (b). Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 44, 2.03 meters (6.7 feet) west of north-and-south fence, 2.06 meters (6.8 feet) north of east-and-west fence, and 180.76 meters (593.0 feet) from station in azimuth 176°03'43". *T. 4 S., R. 7 W., sec. 2, northeast corner*, is 679.67 meters (2,229.9 feet) from station in azimuth 201°17'05". Elevation of station, 329.9 meters (1,082 feet).

Benton (Jefferson County, Okla., W. Bowie, 1902; 1923).—About 5 miles east and 1 mile north of Sugden, in sec. 25, T. 5 S., R. 7 W., at the highest point of a ridge running north and south on land belonging (in 1923) to Mr. W. A. Paddock. *T. 5 S., R. 7 W., sec. 25, center* (see description thereof), marked by a stone, is 123.93 meters (406.6 feet) from station, in azimuth 282°07'43". Surface mark is a standard disk station mark in top of tile, note 6 (b); disk is stamped "Benton 1902." Underground mark is a bottle set in concrete, top of bottle being 2½ feet below surface. Reference mark (1902) is a stone 9 by 11 by 21 inches set in concrete in the southwest corner of Jackson's yard, the center mark being a cross cut in the stone, 23.10 meters (75.8 feet) from the station in azimuth 233°25'. In 1923 an additional reference mark no. 2 was set, consisting of a standard reference disk set in the fence line near the stone marking center of section; it is 125.43 meters (411.5 feet) from the station, in azimuth 255°19'27". Elevation of station, 301.4 meters (989 feet).

Grady (Jefferson County, Okla., W. Bowie, 1902).—About 2 miles north and 1 mile west of the village of Grady, 4 miles north of the Red River, on the highest and most northerly part of a bare ridge three-eighths mile long running north and south in an open prairie, on land claimed by Thomas Gardiner and leased by Calvin Duger. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is 40-penny wire nail in a block of cement 8 inches in diameter and 5 inches deep placed 2½ feet below the surface mark. Reference mark is a nail in terra-cotta pipe set in concrete, note 44. It is 179.06 meters (587.5 feet) from the station in azimuth 97°00'31". *Section corner near station Grady* is distant 660.0 meters (2,165 feet) in azimuth 16°29'10". Elevation of station, 283.0 meters (928 feet).

Blue (Montague County, W. Bowie, 1902).—About ½ mile north of the town of Nocona, on the Missouri, Kansas and Texas Railway, on a prominent hill known as Blue Mound, on land of D. R. Skeen, 7 yards north of a road fence. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to the surface mark, and is described in note 34. Reference mark also is of same type as surface mark, and is described in note 44. It is at a fence corner east of the station, and 128.958 meters (423.09 feet) from the station in azimuth 273°34'04". *Nocona, schoolhouse, cupola* is 962.2 meters (3,157 feet) from the station in azimuth 4°03'51". Elevation of station, 312.1 meters (1,024 feet).

Cube (Clay County, O. W. Ferguson, 1902; 1923).—About 9½ miles north and 2½ miles east of Henrietta, 1 mile north of a schoolhouse on the Henrietta and Riverdale road, near the southeast corner of a tract of land designated as "abstract no. 307, Montague County school survey no. E", on the highest part of the hill owned by Mr. Cueba, 22 paces east and 6 paces south of the northeast corner of Mr. Cueba's barn, and 49 paces west and 17 paces south of the southwest corner of his house. Station marked underground by a nail in terra-cotta pipe filled with and surrounded by concrete, 2 feet below surface of ground, note 34. Surface mark originally was similar to underground mark, note 24. In 1923 a standard disk was substituted for nail, note 6 (b). Disk is stamped "Cube 1902." The reference mark is a nail in concrete, in center of a terra-cotta pipe filled with and set in concrete block, note 44. It is in the field at southeast corner of Mr. Cueba's land, 9.537 meters (31.29 feet) west of a stone marking his property corner and 1 foot north of center line of posts of his south fence, and is 223.174 meters (732.20 feet) from the station in azimuth 333°16'33". Other distances and azimuths are as follows: East end of ridge of barn, 47.66 meters (156.4 feet), 21°42'; southwest corner (near ground) of stone chimney of house (corner extends 1 to 7 feet above ground), 52.40 meters (171.9 feet), 236°22'. Elevation of station, 298.8 meters (980 feet).

Queen (Montague County, W. Bowie, 1902).—About 6 miles west of north from Bowie, at the highest point of a prominent cone-shaped peak known as Queen Peak, on the land of E. Bates. The surface mark is a nail in terra-cotta pipe set in concrete, note 24. It is located between three large rocks. The underground mark is a nail embedded in a small block of concrete. The reference marks are two holes, each $\frac{3}{4}$ inch in diameter and $1\frac{1}{2}$ inches deep, drilled in solid rock, and each circumscribed by a triangle. Reference mark no. 1 is 5.57 meters (18.3 feet) from the station in azimuth $192^{\circ}49'$; reference mark no. 2 is 5.14 meters (16.9 feet) in azimuth $327^{\circ}31'$. Elevation of station, 362.5 meters (1,189 feet).

Myers (Clay County, O. W. Ferguson, 1902).—About 14 miles south by west of Henrietta, and $3\frac{1}{2}$ miles southeast of Blue Grove, between the Henrietta and Antelope road to the north and west and the Henrietta and Jacksboro road to the east, on the high wooded ridge 185 meters (607 feet) N. $7^{\circ}35'$ E. of the broken rocky cliff at the end of the hill, and about 140 meters (459 feet) northeast of the highest part of the hill, on land known as the Charlton Thompson survey, owned by W. H. Myers. The surface mark is a nail in terra-cotta pipe set in concrete, note 24. The underground station mark is a spike set in concrete in a hole 6 inches in diameter and 6 inches deep, cut into the rock. The reference mark is a $\frac{1}{2}$ -inch drill hole in a prominent rock, surrounded by an equilateral triangle 10 inches on a side, one apex of which points to the station. It is located about the center of a rocky break, 28 meters (92 feet) south of the north end of the central promontory and 156.174 meters (512.38 feet) from the station in azimuth $8^{\circ}17'50''$. The west gable of the Myer's house is 413 meters (1,355 feet) from the station in azimuth 257° . Elevation of station, 345.3 meters (1,133 feet).

Jones (Clay County, O. W. Ferguson, 1902).—About $2\frac{1}{4}$ miles south and 3 miles west of town of Vashti, on land formerly belonging to Freestone County School, but now owned by J. E. George, and 3.45 meters (11.3 feet) south and 3.80 meters (12.5 feet) west of southeast corner of cultivated field. Surface mark is probably nail in terra-cotta pipe set in concrete, note 24, flush with ground. Underground mark is probably similar to surface mark, as described in note 34. Reference mark is nail in terra-cotta pipe set in concrete, note 44, flush with ground. It is in corner of pasture land, 0.62 meter (2.0 feet) east of north-and-south fence, 0.70 meter (2.3 feet) south of east-and-west fence running toward station, and 99.028 meters (324.89 feet) from station in azimuth $96^{\circ}02'$. Following distances and azimuths are from station: Center of stone chimney on unoccupied house of J. E. George, known as F. M. Evans place, on south side of Newport and Henrietta Road, about 130 meters (427 feet) farther west than station, $152^{\circ}45'32''$; intersection of north-and-south fence with south fence along Newport and Henrietta Road, 277.3 meters (910 feet) (measured along north-and-south fence), $184^{\circ}18'38''$; center of stone chimney on west end of house of Tom Flinn, occupied by Mr. Davis, north of Newport and Henrietta Road, and east of lot 6718 of Texas Emigration Co., $213^{\circ}54'55''$; fence corner, at northeast corner of Mr. George's land at intersection of south fence along Newport and Henrietta Road with west fence along north-and-south road, 348 meters (1,142 feet), $218^{\circ}03'58''$; west end of ridge of roof of Tom Flinn's residence southeast of intersection of said roads, $230^{\circ}50'39''$. Elevation of station, 362.4 meters (1,189 feet).

Bowie northwest base (Clay County, A. L. Baldwin, 1900; 1907).—On a prominent knoll, 1 mile southeast of Bellevue, which is on the Fort Worth & Denver City Railway, on the land of J. D. Orton. Surface mark is an old type station mark in limestone block set in concrete, note 25. The underground mark is a copper bolt leaded into bedrock, 3 feet below the surface of the ground. The reference mark is a red sandstone post, 12 inches deep and 6 inches square projecting 3 inches above the ground, with a hole 1 inch in diameter drilled in the center of the top. It is on the fence line between Orton's ranch and that to the north, 159.16 meters (522.2 feet) from the station in azimuth $176^{\circ}42'$. Other distances and azimuths are as follows: Southwest corner of Orton's house, 123.74 meters (406.0 feet), $262^{\circ}27'$; southwest fence corner of Orton's garden, 22.6 meters (74 feet), $191^{\circ}12'$. Elevation of station, 327.46 meters (1,074.3 feet).

Bowie southeast base (Clay County, A. L. Baldwin, 1900; 1906).—West of the city of Bowie and southeast of the town of Bellevue, on the highest part of a prominent ridge, on the land of C. H. Bodeker. Surface mark is old type station mark in limestone block set in concrete, note 25. Underground mark is copper bolt in a limestone block set in concrete, note 35. Reference mark is the center of a drill hole one-half inch in diameter and $2\frac{1}{2}$ inches deep, surrounded by a

triangle 7 inches on a side, cut in the rock at the top of the ledge southwest of the station, 14 feet from the front angle of a break in the rock and about in the center of a high knob of rock. It is 74.870 meters (245.64 feet) from the station in azimuth $45^{\circ}31'$. The distance and azimuth to a post marking a corner are respectively, 423.5 meters (1,389 feet) and $109^{\circ}50'$. Elevation of station, 333.40 meters (1,093.8 feet).

Indian (Jack County, W. Bowie, 1902).—About $1\frac{1}{2}$ miles west of the eastern branch of the Jacksboro-Antelope road, at the highest point of the most southwesterly of the three prominent peaks known as the Indian Hills, on land of Gabo Washburn. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is a hole, three-fourths inch in diameter, drilled to a depth of $1\frac{1}{2}$ inches in solid rock and surrounded by a triangular mark, 13.33 meters (43.7 feet) from the station in azimuth $7^{\circ}06'$. Elevation of station, 395.2 meters (1,297 feet).

Spradling (Jack County, W. Bowie, 1902).—About 6 miles south of Newport and 8 miles north of Cundiff, on a wooded hill about 500 yards east of the Newport-Jacksboro road, on land of J. A. Spradling. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, is described in note 44, and is 11.975 meters (39.29 feet) from the station in azimuth $148^{\circ}51'$. Other distances and azimuths are as follows: Center of the Spradling house, about 775 yards $358^{\circ}01'$; chimney of Mayo's house, about 775 yards, $78^{\circ}57'$; normal to the fence between the properties of J. A. Spradling and J. W. Mayo, 39.3 meters (129 feet), $97^{\circ}01'$. Elevation of station, 375.7 meters (1,233 feet).

Moore (Jack County, W. Bowie, 1902).—About $4\frac{1}{2}$ miles southeast of Jacksboro, at the highest point of the south end of a wooded ridge running north and south on land of H. H. Cobb, of Fort Worth, and about one-half mile north of Cobb's house. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, is described in note 44, and is in a clearing in the woods north of the station, 86.719 meters (284.51 feet) from the station in azimuth $185^{\circ}42'$. Elevation of station, 383.6 meters (1,259 feet).

Woolly (Jack County, O. W. Ferguson, 1902).—In the southwest corner of Jack County, 10 miles east of south from Bryson, 10 miles west of north from Christian, 7 miles northeast of Finis, 2 miles south of the Weatherford-Graham wagon road, 1 mile southwest of Sam Martin's house, and 1 mile south-southeast of Leslie Knight's house. The station is on a high tableland which forms the top of a spur of Salt Creek Mountains, $4\frac{1}{2}$ miles long by one-half to 1 mile wide, extending north-northeast and south-southwest, and lying between Long Hollow Creek to the north and west and Salt Creek to the east, on a level piece of ground, on which oak trees are growing, about 1 mile from the southern end of the tableland, on the property of Mr. Knight. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, and is described in note 44. Its location is indicated by three square-blazed oak trees, one 6 inches in diameter, N. 84° W., 7.3 meters (24.0 feet); another 11 inches in diameter, N. 81° E., 8.36 meters (27.4 feet); the third, 9 inches in diameter, S. 13° E., 11.70 meters (38.4 feet). The reference mark is 131.051 meters (429.96 feet) from the station in azimuth $321^{\circ}08'25''$. The west gable of Martin's house is about 1 mile from the station in azimuth $226^{\circ}54'54''$. Elevation of station, 449.7 meters (1,475 feet).

Davis (Jack County, W. Bowie, 1902).—About 16 miles southeast of Jacksboro, $4\frac{1}{4}$ miles west of Gibtown and 3 miles south of Joplin, 150 yards southwest of the Jacksboro and Gibtown wagon road, at the highest point of a wooded hill, on land of H. P. Sillivant. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, is described in note 44, and is at the fence corner east of the station, on the west side of the Jacksboro-Gibtown road, 103.115 meters (338.30 feet) from the station in azimuth $284^{\circ}24'40''$. Elevation of station, 386.5 meters (1,268 feet).

Kyle (Palo Pinto County, O. W. Ferguson, 1902).—About 4 miles north by west from the town of Palo Pinto, $1\frac{1}{2}$ miles west of the Palo Pinto-Jacksboro wagon road, and 3 miles south of the ford where this road crosses the Brazos River, on the highest part of Kyle Mountain, which rises above the south bank of the Brazos River, and the top of which is a tableland of 2 acres area. The station is in the middle of this tableland longitudinally and about one-fourth

of the distance from the northeast end, on land of Mrs. T. Anna McClure. The station mark is a 6-inch bed of concrete sunk 24 inches below the surface, containing a wire spike which projects one-fourth inch above the top of the concrete, covered with 4 inches of sand, above which is a piece of terra-cotta pipe 14 inches long embedded in concrete, with a 60-penny wire nail at the center. The reference mark is a drill hole, five-eighths inch in diameter and $1\frac{1}{2}$ inches deep, in one of the highest and most prominent of the large rocks near the station, surrounded by a triangle, 5 inches on a side, with one apex pointing toward the station, cut into the rock. It is 52.472 meters (172.15 feet) from the station in azimuth $38^{\circ}07'$. Elevation of station, 412.4 meters (1,353 feet).

Gilbert (Parker County, W. Bowie, 1902; 1906).—About $6\frac{1}{2}$ miles by road northwest from Weatherford, $1\frac{1}{2}$ miles north of the railway station at Lambert, one-half mile north of the Weatherford-Mineral Wells wagon road, and one-half mile south of the Blue Springs-Weatherford road, at about the center of a prominent bare ridge, on land of Mrs. A. N. Spivey. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, and is described in note 44; it is located in a fence line east of the station, near the top of the ridge, and 109.831 meters (360.34 feet) from the station in azimuth $261^{\circ}56'32''$. Elevation of station, 397.2 meters (1,303 feet).

Oaks (Palo Pinto County, O. W. Ferguson, 1902).—About 9 miles by wagon road south of Mineral Wells, on the east shore of the Brazos River, at about the extreme southwest point of a long, high ridge of tableland, 50 yards from the edge of the bluff to the southwest, and near the south end of G. D. Oaks' ranch, on land claimed by both G. D. Oaks and J. H. Wharton. The surface mark at the station is nail in terra-cotta pipe set in concrete, note 24. The underground mark is a large spike embedded in concrete. The location is indicated by two trees, an elm 10 inches in diameter, blazed with a box 3 feet about ground, 5.9 meters (19 feet), N. 19° W. from the station; the other, an oak 12 inches in diameter, box blazed, 7.4 meters (24 feet), S. 7° E. The reference mark is 3.6 feet south of the east-and-west wire fence put up by Wharton, and in line (extended) of the wire fence running from this fence northwest. It is 131.432 meters (431.21 feet) from the station in azimuth $198^{\circ}13'52''$. The west pier of the Texas & Pacific Railway bridge across the Brazos River is about $1\frac{1}{4}$ miles from the station in azimuth $354^{\circ}05'09''$. Elevation of station, 334.8 meters (1,098 feet).

McClenny (Erath County, O. W. Ferguson, 1902).—About 6 miles by road north of the town of Morgan Mill, on the Morgan Mill-Caraway-Roberts Settlements road, between the Morgan Mill-Gordan road to the west and the Morgan Mill-Santo road to the east, at the center and highest point of a long wooded ridge extending east-northeast and west-southwest. The station is between Paluxy Creek to the south and Buck Creek to the north, three-fourths mile west by south from what is known as "B.D." spring, and 100 yards east of the road, on the land of Dr. R. E. McClenny. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. The location of the station is indicated by three square-blazed oak trees; one, 14 inches in diameter, 13.17 meters (43.2 feet), N. 38° E.; another, 9 inches in diameter, 6.20 meters (20.3 feet), S. 65° E.; the third, 8 inches in diameter, 5.13 meters (16.8 feet), N. 88° W. Reference mark is of same general type as surface mark, and is described in note 44. Its location is indicated by three oak trees; one, 10 inches in diameter, 3.10 meters (10.2 feet), N. 34° E.; another, 6 inches in diameter, 6.25 meters (20.5 feet), S. 56° E.; the third, $8\frac{1}{2}$ inches in diameter, 6.70 meters (22.0 feet), S. 83° W. The reference mark is 53.915 meters (176.89 feet) from the station in azimuth $198^{\circ}47'$. The east gable (end of ridge beam) of O. G. Roberts' house is about three-fourths mile from the station in azimuth $138^{\circ}56'39''$. Elevation of station, 401.6 meters (1,318 feet).

Comanche (U.S.G.S.) (Hood County, W. Bowie, 1902; 1906).—About $4\frac{1}{2}$ miles west of south from town of Granbury, on what is known as Comanche Peak, near southern edge of open ground, over same point as used by U.S. Geological Survey in 1888. In 1902 stone set by U.S.G.S. was replaced by nail set in 2-inch galvanized iron pipe filled with and set in concrete. Reference mark is nail set in terra-cotta pipe filled with and set in concrete, note 44, at edge of brush, 49.306 meters (161.76 feet) from station in azimuth $78^{\circ}20'$. Elevation of station, 374.71 meters (1,229.4 feet).

Pilot (Erath County, W. Bowie, 1902; 1906).—About 5 miles northeast of Stephenville, three-fourths mile south of upper Stephenville-Granbury wagon road, near northwest side of round top of flat-topped peak known as Pilot Knob

and about 65 yards northeast of pond of water on western side of hill, on land owned in 1902 by J. W. Chenault. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is 60-penny wire nail, set in 6 inches of concrete. Reference mark is of same general type as surface mark, and is described in note 44. It is in southwest corner of Chenault's garden, 315.473 meters (1,035.01 feet) from station in azimuth $62^{\circ}29'16''$. Elevation of station, 426.4 meters (1,399 feet).

Gatlin (Erath County, O. W. Ferguson, 1902).—About 9 miles by road N. 21° W. from the courthouse at Stephenville, 3 miles ESE. from Huckabay, 1 mile northeast of the Stephenville-Thurber road, about 600 yards east from the Bethel-Huckabay road, 117 yards northeast from the lane running to the house of W. E. Carr, and 36.34 meters (119.2 feet), north from the line fence of Gatlin and Thompson, which extends northeast and southwest, at the highest point of wooded rocky hill, on the land of E. J. Gatlin. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is a 60-penny wire nail set in 6 inches of concrete. Reference mark is of same general type as surface mark and is described in note 44. It is 8 inches from the northeast fence along the lane to Mrs. Carr's house, on the field side, 107.772 meters (353.58 feet) from the station in azimuth $77^{\circ}18'38''$. Other distances and azimuths are as follows: Center of the eastern face of a stone chimney at the eastern end of Mrs. Carr's house, 166.85 meters (547.41 feet), $44^{\circ}01'18''$; center of the chimney of the house of Robert Thompson, about one-half mile, $307^{\circ}22'59''$. Elevation of station, 452.8 meters (1,486 feet).

Young (Erath County, O. W. Ferguson, 1902).—About 6 miles west-southwest of Stephenville, $6\frac{1}{2}$ miles southeast of Lingleville, 8 miles north by east from Dublin, and one-half mile north of the Stephenville-DeLeon Road, on a high prairie pasture lying south of the South Bosque River, northwest of Alarm Creek, and northeast of the Green Creek tributaries, on land of J. H. Young. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, and is marked according to note 44. It is just within the fence at the southwest corner of Young's pasture, 4.51 meters (14.8 feet) from the center of a narrow lane running northeast and southwest, 2.28 meters (7.5 feet) northeast of a lane running northwest and southeast, 291.457 meters (956.22 feet) from the station in azimuth $357^{\circ}11'45''$. Other distances and azimuths are as follows: D. D. H. Moore's house, center of chimney at west end, about 700 yards, $3^{\circ}13'30''$; N. W. Kiker's house, center of chimney at west end, about 875 yards, $35^{\circ}58'34''$; tile chimney at the south end of Mr. Young's house, about 1,650 yards, $236^{\circ}46'00''$. Elevation of station, 460.1 meters (1,510 feet).

Alarm (Erath County, O. W. Ferguson, 1902).—About 3 miles S. 32° W. from the courthouse at Stephenville, one-fourth mile north of Lee Hughes' house, which stands on the north side of the "Lower Dublin Road", on a high wooded ridge, which is girded on the south, west, and east sides by a bend of Alarm Creek, on the land of J. P. Syler. Location of station is indicated by three box-blazed oak trees; one 10 inches in diameter, 10.42 meters (34.2 feet), S. 25° W.; another 11 inches in diameter, 7.51 meters (24.6 feet), S. 44° W.; the third, 7 inches in diameter, 6.05 meters (19.8 feet), N. 84° W. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, and is described in note 44. Its location is indicated by two box-blazed oak trees; one, 12 inches in diameter, 4.30 meters (14.1 feet), S. 72° E.; the other, 10 inches in diameter, 6.13 meters (20.1 feet), S. 34° W. The reference mark is 76.584 meters (251.26 feet) from the station in azimuth $148^{\circ}25'54''$. The distances and azimuths to other points are: End of ridge beam, west gable, house of W. H. Shanley, about 300 meters, (984 feet) $256^{\circ}16'36''$; chimney on north end of house of Lee Hughes, about 400 meters (1,312 feet), $342^{\circ}38'00''$. Elevation of station, 432.1 meters (1,418 feet).

Lone Mountain (Erath County, W. Bowie, 1902).—About 1 mile west of north from Skippers Gap, near the southeast corner of the top of "Lone Mountain" on land of J. B. Vesey. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. The reference mark is a hole drilled in a rock and surrounded by a triangle cut in the rock southeast of the station and indicated by a pile of stones, 3 feet high, placed over it. It is 35.027 meters (114.92 feet) from the station in azimuth $323^{\circ}27'$. Elevation of station, 429.0 meters (1,407 feet).

Stephenville north base (Erath County, A. L. Baldwin, 1900; 1902).—About 5½ miles east of the courthouse at Stephenville, one-half mile north of the road to Skippers Gap post office, at the highest point of a knoll known as Bunker Hill, on land of J. B. McAdams. Surface mark is old type station mark set in limestone block, note 25. Underground mark is copper bolt set in limestone block, note 35. Reference mark is a hole surrounded by a triangle on the south side of the remains of an old chimney just north of the station, 9.940 meters (32.61 feet) from the station in azimuth 165°28'. Elevation of station, 426.9 meters (1,401 feet).

Stephenville south base (Erath County, A. L. Baldwin, 1900; 1902).—About 1 mile south of west from Selden, 8 miles southeast from Stephenville, near the southern extremity of a low wooded ridge, about 325 yards south of the house of Thomas Perry. Surface mark is old type station mark in limestone block set in concrete, note 25. Underground mark is copper bolt in limestone block set in concrete, note 35. Reference mark is a cross cut in a stone, which is about 12 by 4 by 30 inches deep and marked with the letters "U.S." It is 2 meters (6.6 feet) from a tree blazed with a triangle and 24.722 meters (81.11 feet) from the station in azimuth 44°32'. Elevation of station, 400.3 meters (1,313 feet).

Gibson (Erath County, W. Bowie, 1902).—About 14 miles southeast of Dublin, 3 miles by wagon road northwest of Carlton, on land of J. T. Gibson, 70 yards southwest of his house and about 16 yards from the Carlton-Hamilton wagon road. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is of same general type as surface mark, and is described in note 44; it is just southwest of Gibson's house in the corner of his garden, 39.213 meters (128.65 feet) from the station in azimuth 202°47'. Elevation of station, 423.0 meters (1,388 feet).

Gleason (Hamilton County, O. W. Ferguson, 1902).—About 9 miles S. 33° E. from the city of Hico, 2½ miles northeast by east from the village of Fairy or Martins Gap, on a high ridge one-half mile north of what is known as Cedar Spring, and about 200 yards north of the center of the land of John Linebarger. Surface mark is iron nail in iron pipe in concrete, note 26. Underground station mark is a 60-penny wire nail set in 6 inches of concrete. Reference mark is similar to surface mark, and is described in note 45. It is 1 foot west of Linebarger's partition fence running north and south between the cultivated and pasture land, 85.059 meters (279.06 feet) from the station in azimuth 331°42'. Other distances and azimuths are as follows: Stone 12 by 14 by 3 inches, slightly embedded, bearing the faint mark "U S + G S" (probably station *Evans* (U.S.G.S.)), 6.953 meters (22.81 feet), 243°16'; center of an oak tree 20 inches in diameter, on which the scaffold of the U.S. Geological Survey rested, 8.380 meters (27.49 feet), 243°56'; south end of the ridge beam of the house of J. F. Merritt, about one-half mile, 109°58'42''; north end of the ridge beam of Mr. Linebarger's house, about one-fourth mile, 117°57'29''. Elevation of station, 405.9 meters (1,332 feet).

Chamliiss (Hamilton County, W. Bowie, 1902; 1906).—About 3 miles south of town of Hamilton, on more northern of two prominent knolls, on land owned in 1902 by J. M. Chamliiss, about 100 meters (328 feet) northwest of his house. Station marked as follows: A hole, 20 inches in diameter, was dug 16 inches deep down to bedrock, and hole, 3 inches in diameter and 8 inches deep, was drilled in rock; this lower hole was nearly filled with cement in which 60-penny wire nail was inserted, with its point 2 inches below surface of rock; lower hole was then filled with sand level with rock. Surface mark is nail set in piece of 4-inch terra-cotta pipe, 16 inches long, filled with and set in concrete. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 44, near Hamilton-Lampasas wagon road, at fence corner which is northeast corner of the Chamliiss property, 271.296 meters (890.08 feet) from station in azimuth 240°04'42''. Elevation of station, 408.8 meters (1,341 feet).

Scoggins (Hamilton County, O. W. Ferguson, 1902; 1919).—About 5 miles from Jonesboro, at the west side of the road along a high ridge 325 yards west of the road leading north from Jonesboro, on the Strickland Ranch, and west of a cultivated field. Surface mark is nail in iron pipe set in a block of concrete, note 26. The underground mark is a 60-penny wire nail set in concrete. Reference mark is similar to the surface mark, is described in note 45, and is 6 inches west of the fence on the east side of the road which separates the meadow land from the pasture land, 69.286 meters (227.32 feet) from the station in azimuth 188°38'. The west end of the ridge beam of the house of J. S. Scoggins is 144.033 meters (472.55 feet) from the station in azimuth 320°06'36''. Elevation of station, 379.9 meters (1,246 feet).

Brown (Coryell County, W. Bowie, 1902).—About 4 miles by wagon road southeast of Evant, one-fourth mile north of the Pearl-Evant wagon road, in the southeast corner of a field, on the land of W. H. Brown and about 650 yards south of his house. Surface mark is nail in iron pipe set in block of concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is located in the woods south of the station and within about 10 yards of three large oak trees marked with triangles facing it. It is 94.035 meters (308.51 feet) from the station in azimuth $9^{\circ}23'$. Elevation of station, 448.2 meters (1,470 feet).

King (Coryell County, O. W. Ferguson, 1902; 1919).—About $9\frac{1}{4}$ miles southwest of Gatesville, 1 mile northeast of King post office, $1\frac{1}{4}$ miles south of the Gatesville-Pearl wagon road, one-fourth mile north of the Gatesville-Lampasas road, and $1\frac{1}{2}$ miles north-northeast from Cowhouse Creek, on northwest side of highest and northernmost of two prominent hills which are the last of a high ridge extending to northwest. Original surface mark was nail set in 2- by 24-inch iron pipe filled with and set in concrete. In 1919 it was found damaged and was replaced by standard station disk in concrete. Underground mark is nail set in 2- by 24-inch galvanized-iron pipe which is filled with and set in concrete. Reference mark is nail in terra-cotta pipe set in concrete, as described in note 44. (In 1919 it was found considerably hammered but otherwise in good condition.) It is in an open space of ground in line with two live-oak trees, 6 inches in diameter and about 2 yards apart, the nearest tree being box-blazed and distant 4.45 meters (14.6 feet) N. 7° E. from the reference mark. Reference mark is 57.153 meters (187.51 feet) from station in azimuth $118^{\circ}16'$. Other distances and azimuths are as follows: South end of ridge beam of house of A. F. Neutzter, about three-fourths mile, $190^{\circ}52'40''$; spire of German Evangelical Church, about 2 miles, $213^{\circ}36'27''$. Elevation of station, 357.7 meters (1,174 feet).

Franklin (Lampasas County, W. Bowie, 1902).—About 14 miles northwest of Copperas Cove, 3 miles south of east of Higgins Gap, near the southern extremity of a very prominent wooded ridge, running about northwest and southeast, on the land of B. M. Franklin, of Lampasas. Surface mark is nail in iron pipe set in block of concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, and is described in note 45. It is south of the station and about 2 yards east of a twin-oak tree, each of the two parts of which is marked with a triangle facing the reference mark, and is 82.585 meters (270.95 feet) from the station in azimuth $342^{\circ}55'$. Elevation of station, 427.1 meters (1,401 feet).

Gilmore (Coryell County, O. W. Ferguson, 1902; 1927).—In the southwest corner of Coryell County, 2 miles W. by S. from the village of Copperas Cove, about 1 mile northwest of Guy Elliot's house, on land owned by Dave Suhlett, at the highest point and center of a wooded, starfish-shaped mountain, 150 yards north of the point where the power line crosses the ridge. Land formerly belonged to J. N. Gilmore. The location of the station is indicated by three box-blazed trees, one, a black oak 7 inches in diameter, 11.41 meters (37.4 feet), S. 55° E.; another, a live oak, 12 inches in diameter, 20.15 meters (66.1 feet), S. 25° W.; and the third, a red oak, 8 inches in diameter, 17.11 meters (56.1 feet), N. 11° E. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark also is of the same type as the surface mark, and is described in note 44. Its location is indicated by two box-blazed live oaks, one, 6 inches in diameter, 5.57 meters (18.3 feet), N. 18° E.; the other, 8 inches in diameter, 3.36 meters (11.0 feet), N. 73° E. The reference mark is 91.106 meters (298.90 feet) from the station in azimuth $215^{\circ}49'$. Other distances and azimuths are: Center of south face of stone chimney on the house of H. B. Scott, about $1\frac{1}{4}$ miles $201^{\circ}51'36''$; center of chimney on the house of C. H. Cosper, about three-fourths mile $180^{\circ}58'06''$. In 1927 it was reported that surface mark had been broken into halves; reference mark was in good condition. Elevation of station, 392.15 meters (1,286.6 feet).

Flat Top (Lampasas County, W. Bowie, 1902).—About 8 miles northwest of Lampasas, three-fourths mile north of the Lampasas-Lometa wagon road, at about the center of the crest and about 80 yards from the southeast end of what is known as Flat Top Peak. Surface mark is nail in terra-cotta pipe set in concrete, note 24. For underground mark a hole, 20 inches in diameter, was dug 16 inches deep, to bedrock, then a hole 3 inches in diameter was drilled to a depth of 8 inches; in this hole a copper bolt, 1 inch in diameter and 4 inches long, was set and surrounded by cement, the top of the bolt being 4 inches below the surface of the rock; the lower hole was then filled to the surface of the rock with sand. The

reference mark is a hole drilled in solid rock and surrounded by a triangle cut in the rock, 17.396 meters (57.07 feet) from the station in azimuth $139^{\circ}53'$. Elevation of station, 466.7 meters (1,531 feet).

Bachelor (Burnet County, W. Bowie, 1902).—About 8 miles by road south of east of Lampasas, about 650 yards northeast of the Lampasas-Georgetown wagon road, at the center of the top of a sharp-pointed hill called "Bachelor Peak", on the land of A. S. Eldredge. The peak was a station of the United States Geological Survey, but no station mark was found. Owing to the shape of the hill, it is probable that the stations were within a yard of each other. The station mark is the same as described for *Flat Top* (see description thereof) except that a 60-penny wire nail was used for the underground mark. No reference mark was put in on account of the sharpness of the peak. In 1927 it was reported that marks had been dug up and station destroyed. Elevation of station, 423.7 meters (1,390 feet).

Lampasas northeast base (Lampasas County, A. L. Baldwin, 1900; 1927).—About $2\frac{1}{2}$ miles S. 80° E. of Lampasas, about 275 yards north of the Lampasas-Belton road, about 325 yards south of Sulphur Creek, at the highest and most northerly rocky and wooded point, on the land of Moses McCormic. Surface mark is old-type station mark in limestone block set in concrete, note 25. Underground mark is copper bolt in limestone block set in concrete, note 35. Disk was stamped "1034.88 ft." The reference mark is a three-fourths inch hole drilled to a depth of 2 inches and surrounded by a triangle cut into the rock which is the highest in the vicinity, 34.743 meters (113.99 feet) from the station in azimuth $70^{\circ}57'$. Other distances and azimuths are as follows: Stone chimney of the house of Judge Parks, about 550 yards, $191^{\circ}39'45''$; stone chimney on house of Aleck Northerton, about 975 yards, $310^{\circ}36'35''$; stone chimney on house of Will Griffin, about 1,200 yards, $314^{\circ}44'16''$. Elevation of station, 315.45 meters (1,034.9 feet).

Lampasas southwest base (Burnet County, A. L. Baldwin, 1900; 1927).—About 2 miles S. 8° E. from Lampasas, one-third mile east of the Settlement road, and 1 mile west of the Lampasas-Austin road, on land owned by Villard Campbell, on the north point of the northernmost prairie ridge. Surface mark is old-type station mark in limestone block set in concrete, note 25. Disk was stamped "1,251.88 ft." Underground mark is copper bolt in limestone block set in concrete, note 35. The reference mark, located at the break of the hill in the most prominent cap rock, is a hole three-fourths of an inch in diameter drilled $1\frac{1}{4}$ inches into the rock and surrounded by a triangle 5 inches on a side cut in the rock, 43.957 meters (144.22 feet) from the station in azimuth $52^{\circ}33'$. Distances and azimuths to other points are: Stone chimney on Russell's house, about $1\frac{1}{4}$ miles, $253^{\circ}00'04''$; stone chimney on the house of J. P. Berry, about one-half mile, $294^{\circ}24'37''$. Elevation of station, 381.59 meters (1,251.9 feet).

May (Burnet County, W. Bowie, 1902; 1903).—About 17 miles west of south of Lampasas, 8 miles north of Burnet and about 30 meters (98 feet) west of Lampasas-Burnet wagon road, on wooded ridge running about northeast and southwest, on land of A. L. May and about 100 meters (328 feet) northeast of his house. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is same as described for *Flat Top* (see description thereof). Reference mark is same type as surface mark, is described in note 44, is about 60 meters (197 feet) west of May's house, and 151.635 meters (497.49 feet) from station in azimuth $51^{\circ}56'04''$. United States Geological Survey flagpole in cedar tree, is 57.54 meters (188.8 feet) from station in azimuth $143^{\circ}30'$. In 1903 following additional distances and azimuths were observed: Center of big stone chimney on Mr. May's house, about 90 meters (295 feet), $39^{\circ}10'$; triangular blaze on cedar tree, about 50 meters (164 feet), $142^{\circ}50'$; stove pipe on Mr. Lastly's house (no chimney), about 180 meters (591 feet), $152^{\circ}15'19''$. Elevation of station, 466.7 meters (1,531 feet).

Gabriel (Williamson County, O. W. Ferguson, 1902).—About 2 miles, S. 37° W. of Gabriel Mills, about 650 yards east of the Georgetown-Gabriel Mills-Lampasas road, on southwest point of what is known as Pilot Knob, on land of J. M. Pearson, and three-fourths of a mile west of his house. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. One reference mark of same general type as surface mark, and described in note 44, is witnessed by two box-blazed trees, one a post oak 8 inches in diameter 8.36 meters (27.4 feet) N. 86° E., the other a black jack 5 inches in diameter 4.94 meters (16.2 feet) S. 18° E.; and is 76.260 meters (250.20 feet) from station in azimuth $184^{\circ}32'$. Other reference mark located at southwest

corner of hill at first break in hill and line of rock, is a hole three-fourths inch in diameter and seven-eighths inch deep drilled in hard limestone rock and surrounded by a triangle with 3-inch sides; and is 24.067 meters (78.96 feet) from the station in azimuth $15^{\circ}39'$. Three box-blazed oak trees are at the following distances and directions from station: One, 6 inches in diameter, 15.83 meters (51.9 feet) N. 42° E.; another, 14 inches in diameter, 13.05 meters (42.8 feet) N. 78° E.; the third, 10 inches in diameter, 18.86 meters (61.9 feet) S. 67° E. Elevation of station, 368.3 meters (1,208 feet).

Buzzard (Burnet County, O. W. Ferguson, 1903).—About 9 miles by road and 7 miles direct southwest from Bertram, $1\frac{1}{2}$ miles southwest of Old Cedar Mills, and about 1 mile east by north from Buzzard Roost, on Post Oak Ridge. The station is at the north edge of the woods and the south edge of a cotton field, on land owned by William Rodgers, who lives a quarter mile northwest on the edge of the same field, and is 6.83 meters (22.4 feet) north of the wire fence along the woods line. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, note 34. Reference mark is also of same type as surface mark, is described in note 44, and is in the field one-half meter ($1\frac{1}{2}$ feet) from the wire fence and 67.603 meters (221.79 feet) from the station in azimuth about 325° . Elevation of station, 432.0 meters (1,417 feet).

Post (Burnet County, W. H. Burger, 1903).—About 1 mile west of Burnet, on Post Mountain, in a pasture belonging to Mr. James Cole, who lives at Burnet, near the south edge of a small open rocky space near the south edge of the mountain, 8 or 9 paces from the brow. The top of the mountain is covered with small brush and trees 10 to 20 feet high. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is nail set in concrete in solid rock, note 8 d. There are two reference marks, drill holes in solid rock, as described in note 46. No. 1 is on the highest part of a large flat rock (rising about 8 inches above the ground) at the west edge of the open space at the south brow of the mountain, about 21 paces from the south brow, 29 paces from the brow to the westward, and 55 paces from the brow to the eastward. It is 21.992 meters (72.15 feet) from the station in azimuth $150^{\circ}05'$. Reference mark no. 2 is on a large flat rock rising 5 inches above the ground at the north edge of the open space mentioned above, and 37.245 meters (122.19 feet) from the station in azimuth $180^{\circ}56'$. The distances and azimuths to other points are: Witness tree, a scrub oak about 15 feet high and 10 inches in diameter at blaze about 2 feet from ground on side facing station, and having a nail in center of triangle formed by 6 other nails in blaze, 8.38 meters (27.5 feet), 138° ; high school, Burnet, 1 mile, 239° ; courthouse, Burnet, 1 mile, $251^{\circ}32'35''$; center chimney of Mr. Pairo's house, 1 mile, $111^{\circ}13'06''$; railroad water tank $\frac{1}{2}$ mile south of Burnet, $285^{\circ}14'54''$. Elevation of station, 471.1 meters (1,546 feet).

Travis (Travis County, O. W. Ferguson, 1903).—About $3\frac{1}{2}$ miles in a direct line from Travis Peak; three-fourths mile in a direct line about N. 15° E. from a tank on the northeast side of the Leander-Travis Peak wagon road at a sharp turn in the road; in the Woolf pasture, upon the highest and gently rounding top of Post Oak Ridge, at its northeastern extremity. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. There is no reference mark. "Travis Peak", a high lone conical-shaped hill, about 3 miles distant, is in azimuth $119^{\circ}34'$. A live-oak tree 4 inches in diameter, distant from the station 28.12 meters (92.3 feet), in azimuth $280^{\circ}39'$, is marked by an isosceles triangle, base 3 inches, sides 5 inches, cut deeply into the tree on the side facing the station and 8 inches above the ground. A Spanish oak tree 7 inches in diameter at the base and 8.10 meters (26.6 feet) distant, in azimuth $51^{\circ}06'$, is marked 10 inches above ground on the side facing the station by a deeply cut equilateral triangle, $3\frac{1}{2}$ inches on a side. A Spanish oak 8 inches in diameter, distant 35.14 meters (115.3 feet) in azimuth $83^{\circ}45'$, is marked 1 foot above the ground on the side facing the station by a deeply cut equilateral triangle 5 inches on a side. Elevation of station, 395.6 meters (1,298 feet).

Shovel (Blanco County, W. H. Burger, 1903).—On the west and highest part of Shovel Mountain, about 9 miles east of south from Marble Falls, and $2\frac{1}{2}$ miles east of south from Shovel Mountain post office, on land owned by Frank Ebeling, who lives about 3 miles north of the mountain. The mountain is very prominent and can be seen for quite a distance; its west edge is very abrupt. The station is about 38 paces from the brow to the westward, 49 paces from the brow to the southward, in about the center of the clearing on the top of the mountain, just north of the south clump of bushes in the clearing, and 5.914

meters (19.40 feet) in azimuth $89^{\circ}26'$ from *Shovel Mountain (U.S.G.S.)* (see description thereof). Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is iron spike in drill hole, note 8 d. Reference mark is similar to surface mark, and is described in note 45. It is 53.566 meters (175.74 feet) from the station, in azimuth 161° . Distances and azimuths to various other points are: West gable of Mr. Ebeling's barn, $2\frac{1}{2}$ miles, $173^{\circ}18'06''$; top of small U.S.G.S. cairn, $\frac{3}{8}$ mile, $226^{\circ}19'17''$. Elevation of station, 470.0 meters (1,542 feet).

Shingle (near Travis and Hays County line, W. H. Burger, 1903).—Five miles northwest of Fitzhugh, on a prominent bald-topped hill, the north one of a series known for miles around as the "Shingle Hills"; 23 paces from the brow of hill on line to Shovel Mountain, 10 paces from the brow to the eastward, 20 paces from the brow to the westward, 40 paces from the brow to the southward on line to Cedar (which passes just to the west of the house of Mr. Chisholm, 1 mile distant), 39 paces eastward from the posts of an old fence line (county line?) at its highest point in crossing Shingle Hill, and 5.548 meters (18.20 feet) in azimuth $326^{\circ}49'$ from *Shingle Hill (U.S.G.S.)* (see description thereof). Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is nail in concrete in solid rock, note 8 (d). Reference mark is drill hole as described in note 46. It is in the top of a flat stone nearly level with the ground, 7 paces from the brow of the hill toward Shovel Mountain, 9.027 meters (29.62 feet) from *Shingle Hill (U.S.G.S.)*, and 14.148 meters (46.42 feet) from the station in azimuth $128^{\circ}55'$. Distances and azimuths to other points are: West gable of Mr. Wilkie's house, $\frac{1}{4}$ miles, $152^{\circ}36'54''$; center of stone chimney of Mr. Chisholm's house, 1 mile, $312^{\circ}02'21''$; center of stone chimney of Albert Scott's house $\frac{1}{2}$ mile, $328^{\circ}10'55''$. Elevation of station, 431.7 meters (1,416 feet).

Barton (Travis County, O. W. Ferguson, 1903).—Six miles west of Austin (8 miles by wagon road), on the north side of the Austin and Bee Caves wagon road, on a prominent rounded hill covered with small timber abreast of and north of the 8-mile post, upon very rocky ground. Surface mark is probably nail in iron pipe set in concrete, note 26. Underground mark is probably similar to surface mark, note 36. Reference mark is the center of a $\frac{3}{4}$ -inch drill hole, surrounded by a 5-inch triangle, on the most prominent large rock upon the very highest part of the hill, distant 16.193 meters (53.13 feet) from the station in azimuth $54^{\circ}27'$. The stone chimney on the north end of a stone house is in plain view on the slope, about 3 miles distant, in azimuth $42^{\circ}13'42''$. Elevation of station, 315.70 meters (1,035.8 feet).

Cedar (Hays County, O. W. Ferguson, 1903).—Two and one-half miles south of Cedar Valley, upon land owned by Fred Willie, a German, and one of the first settlers, about 1 mile east of his house, and about 150 meters (492 feet) southwest from line between Travis and Hays Counties which runs southeast, upon rather high hill densely covered with cedar. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is iron spike set in concrete in solid rock, note 8 (d), point of nail of underground mark being 27 inches below surface. Reference mark, deep triangle 5 inches on a side, cut into base of live oak tree 1 foot in diameter 0.55 meter (1.8 feet) above ground, facing station, is 7.380 meters (24.21 feet) (slope distance) from *Cedar Hill (U.S.G.S.)* (see description thereof), and 6.191 meters (20.31 feet) (slope distance) from station in azimuth $346^{\circ}48'$. *Cedar Hill (U.S.G.S.)* is 8.517 meters (27.94 feet) from station in azimuth $289^{\circ}08'$. Large stone chimney in west end of Fred Willie's house is distant about 1 mile, in azimuth $81^{\circ}36'00''$; center of stone chimney on Friendship Church is $\frac{1}{4}$ miles distant, in azimuth $247^{\circ}11'04''$; and center of stone chimney on north end of Mr. Rissman's stone house is distant about $\frac{1}{2}$ miles, in azimuth $273^{\circ}19'10''$. Elevation of station, 355.2 meters (1,165 feet).

Loneman (Hays County, W. H. Burger, 1903).—On Lone Man Mountain, 18 miles by road northwest of Kyle, on the International & Great Northern Railway, and about 6 miles north of Wimberley, on the north side of the Blanco City and Kyle wagon road which passes near the foot of the mountain, and three-fourths mile east of where the road to Dripping Springs leaves the Blanco and Kyle road, on the Everett ranch. Lone Man Mountain is made up of a series of terraces of rock, and the top is rather level and oval-shaped. The station is 51 paces from the north point of the oval, which is almost in line to Shingle Hills, 7 paces from the brow of the oval eastward, 19 paces from the brow southward, and $7\frac{1}{2}$ paces from the brow westward. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is nail in concrete in solid rock, note 8 (d). Reference mark is drill hole in rock as described in note 46. It is on the edge of an out-

cropping ledge of rock in the terrace below the top of the oval, 7 paces east of the extreme north edge of the oval, and 6 inches from the outer edge of the rock, about 5 feet below the station, and 3 feet below the north point of the oval, 33.369 meters (109.48 feet) from the station in azimuth $178^{\circ}16'$. The distances and azimuths of various points are: Church at Dripping Springs, 6 miles, $180^{\circ}17'35''$; east gable of Mr. Wood's house, one-half mile, $326^{\circ}14'33''$; north gable of Mr. Brook's house, 2 miles, $17^{\circ}35'17''$; East Twin Sister Peak, 5 miles, $19^{\circ}41'02''$. Elevation of station, 433.3 meters (1,422 feet).

Carpenter (Hays County, O. W. Ferguson, 1903).—Four miles by road west by north, from Buda, on what is known as "Carpenter Hills", in a rocky pasture about 18 meters north of the Buda and Blanco City wagon road, on the land of Mrs. Harrison and her children, who live about 200 meters (656 feet) north by east from the station and upon the same hill. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is of same type as surface mark, is described in note 45, and is at the north side of the wagon road, 0.32 meter (1.0 foot) on the field side of the wire fence and distant 57.574 meters (188.89 feet) from the station in azimuth $276^{\circ}48'$. The center of the stone chimney at the east end of Mrs. William Hancock's house is distant about 70 meters (230 feet) southwest, in azimuth $36^{\circ}48'$; the end of the ridge of the south gable of the house of Capt. Fred Cocker is about $1\frac{1}{2}$ miles north, in azimuth $172^{\circ}58'45''$; the west stone chimney of Mr. S. H. Niven's house, distant about 1 mile, is in azimuth $239^{\circ}08'03''$. Elevation of station, 270.1 meters (886 feet).

Hugo (Hays County, W. H. Burger, 1903).—Two miles by road northwest of Hugo, about 15 miles by road west of San Marcos, about one-half mile north of the San Marcos, Hugo, and Blanco City wagon road, about 200 paces S. 73° W. (true) from the place where the road from Wimberley to Hugo, on crossing the ridge, passes around the last draw, which is very large and extends eastward, and about 300 paces N. 87° W. (true) from where this road meets and follows closely the east property line fence on the top of the ridge. The station is about one-half mile to the northward of the house of Mr. Rolfe, in the Williamson pasture, on a hill covered with cedar and oak and plenty of rocks, known as the "Devil's Backbone", near the southeast edge of a rather open but exceedingly rocky clearing. The station can probably always be found by the seven very large piles of rocks which were used as anchors to the legs of the tower. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is nail in concrete in solid rock, note 8 (d). Reference mark is drill hole in rock, is described in note 46, and is on the highest point of a large rock whose top is from 6 to 8 inches above the neighboring rocks and 2.4 feet higher than the station; it is 29.751 meters (97.61 feet) from the station in azimuth $113^{\circ}49'$. The reference mark is witnessed by three nails driven in a blaze $1\frac{1}{2}$ feet above ground on a cedar tree (6 inches in diameter at the blaze) which is N. $76^{\circ}30'$ E. (true), and 3.51 meters (11.5 feet) from the reference mark. Distances and azimuths to various points are: West chimney of Mr. Williamson's house, 1 mile, $296^{\circ}47'25''$; west gable of old deserted house, three-fourths mile, $309^{\circ}32'13''$; center of the tower of Mr. Rolfe's windmill, one-half mile, $327^{\circ}52'51''$; East Twin Sister Peak, $198^{\circ}42'43''$; west edge of the stone building, Wimberly post office, $215^{\circ}42'57''$. Three nails were driven into a blaze about 2 feet from the ground in the north half of a double Spanish oak tree, which bears S. 52° W. (true), and is 20.62 meters (67.7 feet) from the station. Elevation of station, 401.6 meters (1,318 feet).

Krueger (Hays County, O. W. Ferguson, 1903).—Seven miles by road southwest of Kyle and 7 miles by road north-northwest from San Marcos, on the ranch of W. M. Krueger, on the highest part of a high, rocky, rounded hill partly covered with brush, oak, and cedar. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36, except that the lower pipe is only 6 inches long. The reference mark is on the highest and most prominent hard limestone rock 17.598 meters (57.74 feet) from the station, in azimuth $145^{\circ}08'$, and is a three-fourth-inch hole $1\frac{1}{4}$ inches deep surrounded by a triangle 4 inches on a side, the apex toward the station. Distances and azimuths to various points are as follows: Mr. Krueger's house, center of chimney, about 200 meters (656 feet), $170^{\circ}44'04''$; Park's cabin, center of the stone chimney at the east end, one-half mile, $120^{\circ}14'44''$. Elevation of station, 303.8 meters (997 feet).

Gus (Comal County, O. W. Ferguson, 1903).—Nine miles by road from New Braunfels, about 3 miles in a straight line a little south of west from the village

of Hunter on the International and Great Northern Railway, and 1 mile east of the New Braunfels and Blanco City wagon road, on the ranch owned by Gus Pfeuffer and about 380 meters (1,247 feet) from his house, on a high, rocky, rounding timbered knoll, about 20 feet north of the crest. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is a spike set in drill hole, note 8 (d). Reference mark also is of same type as surface mark, is described in note 45, and is at the south side of an old road, distant 53.348 meters (175.03 feet) in azimuth $114^{\circ}46'$. Distances and azimuths to other points are: Windmill tower at farm, $2\frac{1}{2}$ miles, $310^{\circ}37'56''$; windmill tower at house in the woods, $2\frac{3}{4}$ miles, $325^{\circ}31'15''$; east gable of a large white house, about 3 miles, $18^{\circ}21'55''$. Elevation of station, 322.9 meters (1,059 feet).

Bear (Comal County, W. H. Burger, 1903).—Ten miles by road northwest of New Braunfels, 1 mile south of Bear Creek, and one-fourth mile east of the New Braunfels, Bear Creek and Northwestern wagon road, on a hill covered with cedar, live oak, and plenty of rock, in a pasture belonging to the Borchers brothers, one of whom, Charles, lives about 3 miles southeast on the road to New Braunfels. The station is about one-fourth mile east of the road from the top of the ridge where the gate gives entrance to the pasture. The lowest part of a large basin on the southeast side of the hill is almost directly in line to Mission Hill. Almost due east on the opposite side of a large draw about one-half mile distant is a large spot on the side of the hill, noticeable because of its being almost devoid of trees. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is nail in concrete in solid rock, note 8 (d). Reference mark is drill hole in rock, is described in note 46, and is 22.864 meters (75.01 feet) from the station in azimuth $339^{\circ}44'$. It is on the highest point of a large stone projecting about 8 inches above the surrounding rock, is 1.8 feet lower than the station and is witnessed by three nails driven into a blaze 2 feet from the ground on about the largest cedar tree at the south edge of the brow of the hill. This tree is 7.97 meters (26.1 feet) S. 19° W. (true) from the reference mark. Distances and azimuths to various points are as follows: East gable of house of Charles Arnold, 4 miles, $354^{\circ}39'30''$; Mission Valley Church spire, 5 miles, $347^{\circ}19'47''$; northeast gable of barn of Albert Hartwig, $5\frac{1}{2}$ miles, $340^{\circ}14'05''$. Elevation of station, 364.5 meters (1,196 feet).

Tieken (Guadalupe County, O. W. Ferguson, 1903; 1924).—About $10\frac{1}{2}$ miles northwest from Seguin, and about $8\frac{1}{2}$ miles direct and 11 miles by road E. of N. from New Braunfels, 1 mile direct or $1\frac{1}{4}$ miles by road, N. 15° E. (true) from the Erband and Fisher country store and on the highest part of a ridge in a cotton field on land owned by Mr. Bading, who lives about one-fourth mile west of the station. In 1903 land belonged to a Mr. Tieken. Station is 26 meters (85 feet) west of a north-and-south fence line and is 150 meters (492 feet) north of a private roadway leading to Mr. Bading's house from the east. Station was originally marked at surface by a nail in an iron pipe set in concrete, note 26. It was recovered in 1924 and surface mark reported to be a disk in concrete block, note 1 (a). It is probable that the nail of original mark was replaced with standard disk station mark. Underground mark is nail in iron pipe set in concrete, note 36. In 1924 this was reported as a nail in concrete block, note 7 (c). In 1924 a reference mark was set consisting of standard reference disk in concrete post, note 11 (a). It is in the fence line to eastward, and is 24.413 meters (80.09 feet) from station, in azimuth $267^{\circ}15'$. The reference mark set in 1903 is a nail in iron pipe set in concrete, note 45. It is at the corner of the fence at the south edge of the field and at the north edge of the brush, 0.6 meter (2.0 feet) north and 0.17 meter (0.6 foot) west of the corner post and 114.112 meters (374.38 feet) from the station in azimuth $223^{\circ}26'38''$. Distances and azimuths to various points are: Chimney of Christian Brown's house, about $1\frac{1}{4}$ miles, $133^{\circ}51'43''$; chimney of Mr. Tieken's house, about 700 meters (2,297 feet) $256^{\circ}19'02''$. In 1924 station was reached from Erband and Fishers country store by going east one-half mile to road leading north, then north about 1 mile to foot of hill, and through gate to west leading to Mr. Bading's house. Elevation of station, 220.9 meters (725 feet).

Mission or Mission Hill (U.S.G.S.) (Comal County, W. H. Burger, 1903; 1924).—On Mission Hill, 3 miles by road west of New Braunfels, on land owned in 1903 by Frank Coreth, about 40 paces N. 5° W. (magnetic) of the northwest corner of his house on the top of the same hill. It is identical with *Mission Hill (U.S.G.S.)*, and is marked with their usual pipe which projects 0.85 foot above the ground. The tower is to be boarded up and used as a granary by Mr. Coreth. Reference mark is nail in iron pipe set in concrete, with the letters "U.S.C. & G.S.1903" cut in the cement, note 45, and is at about the same elevation as the

station, close to the fence line on the top of the hill; 2.2 feet west from the fence and 5.8 feet and 7.9 feet north and south, respectively, from two large trees near the tower to which the fence is nailed. Distances and azimuths to various points are as follows: Reference mark, 6.493 meters (21.30 feet), S. 22°45' E. (magnetic); south gable of Mr. Coreth's house, about 50 paces, 0° 40'; *New Braunfels, courthouse tower*, 2½ miles, 288°08'53''; *New Braunfels standpipe*, 2½ miles, 295°37'55''. In 1924 this station was recovered, and a new station established 6.536 meters (21.44 feet) therefrom in azimuth 15° 02' 52''. (See description of *Mission ecc.*) Elevation of station, 295.8 meters (970 feet).

Seguin west base (Guadalupe County, S. Forney, 1899; 1903).—About 6½ miles by road southeast of New Braunfels, about two-thirds mile south of the Seguin and New Braunfels road, on land owned by Mrs. Henry Steinmeier, who lives one-half mile east. The station is on a small rise in small mesquite brush about 250 meters (820 feet) S. 20° W. (magnetic) from the southwest corner of the cotton field of Mrs. Steinmeier, and 130 paces at right angles (east) from the fence line leading from the above-mentioned corner southward to Guadalupe River which is about one-fourth mile distant; the fence line meets the lane which runs to a small boat ferry across the river. The station is marked by a millimeter hole in the center of a bronze station mark set in the top of a hard limestone block 23 inches square and 16 inches high, weighing 700 pounds, which is embedded in a block of concrete 4 feet square and 4 feet deep. The bronze mark mentioned above is not the standard bronze tablet, but is similar in design, the top being 80 millimeters in diameter and having the letters "U.S.C. & G.S." cast on it. The underground mark is a millimeter hole in the center of a copper bolt set in a limestone block 6 inches square and 1 foot long, embedded in concrete, with the bolt 4 feet below the surface of the ground. Over the underground mark is a terracotta pipe 7 inches in diameter and 25 inches long, the top being covered with tin and embedded in the upper mass of concrete. The reference mark is an iron pipe set in concrete, is described in note 45, except there is no nail at the center, is 1 foot lower than the station mark, and 23.80 meters (78.1 feet) from station in azimuth 8°52'. Distances and azimuths to other points are as follows: *New Braunfels, courthouse tower*, 129°51'36''; north gable of Peter Scheler's house, three-eighths mile, 222°12'06''; south gable of Mrs. Steinmeier's house, one-fourth mile, 263°58'42''; west gable of Frankfort school, one-half mile, 269°20' 12''. Elevation of station, 189.09 meters (620.4 feet).

Seguin east base (Guadalupe County, S. Forney, 1899; 1904).—About 9 miles E. by S. from New Braunfels and about 9 miles N. by W. from Seguin, Tex.; three-fourths mile east of the New Braunfels and Beckman gin road, upon the old Henry Loeffe, Sr., farm now owned by William Loeffe, who lives 2 miles north. The station is in a mesquite pasture about 130 feet east of a cluster of large live oak trees and about 80 meters (262 feet) northwest of the "tank" or pond for watering stock. The station was marked in the same way as *Seguin west base* (see description thereof), except the underground mark is a copper bolt cemented into the natural sandstone rock about 32 inches below the surface, and the mass of concrete in which the capstone was set was kept clear of the bolt by means of a box 9 inches square. The reference mark is at the northwest corner of the pasture, 0.69 meter (2.3 feet) east of the west fence and 0.66 meter (2.2 feet) south of the north or lane fence, and 260.979 meters (856.23 feet) from the station in azimuth 113°02'42''. Distances and azimuths to various points are as follows: Chimney at the west end of H. Bading's house, about 1,400 meters (4,593 feet) 344°50'09''; chimney of N. Brauholtz's house, about 1,100 meters (3,609 feet) 16°08'26''; chimney on the north side of H. Henze's house, about 300 meters (984 feet) 108°42'14''. In 1924 this station was reported as lost by the U.S. Geological Survey. Elevation of station, 181.87 meters (596.7 feet).

Mott (Guadalupe County, O. W. Ferguson, 1903).—Two miles north of the courthouse in Seguin and 1 mile north of the Southern Pacific depot, on the west side of the Seguin and Geronimo wagon road, 1.29 meters (4.2 feet) east of the wire fence on the west side of the road. Surface mark is nail in iron pipe in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is of same type as surface mark, is described in note 45, and is at the wire fence at the east side of the road, 17.342 meters (58.54 feet) from the station in azimuth 272°03'. Distances and azimuths to various points are as follows: West tile chimney of Mrs. Schrom's house, about three-fourths mile, 5°02'53''; Mrs. Wagner's windmill tower in a prominent cluster of live oak trees, about 300 meters (984 feet), 204°18'12''; brick chimney of a house about 450 meters (1,476 feet), 282°51'46''. Elevation of station, 177.3 meters (582 feet).

Herndon (Guadalupe County, W. H. Burger, 1903; 1924).—About $2\frac{1}{4}$ miles east of south of Marion, a small town on the Southern Pacific, one-fourth mile south of old Seguin-San Antonio wagon road, on highest point of ridge in cornfield on land owned in 1924 by Otto Rux, who lives one-fourth mile north of station. In 1903 land was owned by a Mr. Krueger, and ridge, which was covered with trees, was known as Herndon Hill. To reach from Marion, go south $1\frac{1}{4}$ miles, take left road $2\frac{1}{4}$ miles to Otto Rux's place, go through yard and along edge of field to station site. Original surface mark was nail in iron pipe set in concrete, note 26. In 1924 surface mark reported a standard disk station mark in concrete block, note 1a. It is probable that in 1924 nail of original mark was replaced with standard disk. Underground mark is nail in iron pipe set in concrete, note 36. In 1924 it was reported as nail in concrete post, note 7c. Reference mark set in 1924 is standard reference disk in concrete post, note 11a, near southwest corner of mesquite pasture and 114.445 meters (375.47 feet) from station in azimuth $220^{\circ}08'58''$. In 1903 marks were placed on trees (which probably no longer exist) as follows: 3 nails in blaze, 2 feet above ground, on 6-inch hickory 25 feet high, 14.02 meters (46.0 feet) from station in azimuth $326^{\circ}50'$; nail in center of triangle $3\frac{1}{2}$ inches on a side, cut in blaze 2 feet above ground, on 8-inch hickory about 18 feet high, 16.36 meters (53.7 feet) from station in azimuth 121° ; 3 nails in blaze $2\frac{1}{2}$ feet above ground, on 8-inch scrub oak about 12 feet high, across road, at east side of small clearing, 30.92 meters (101.4 feet) from station in azimuth $181^{\circ}58'$. In 1903 the following distances and azimuths were observed from station: North gable of house of Charles Strey, three-eighths mile, $341^{\circ}42'52''$; east gable of house of William Krueger, one-fourth mile, $38^{\circ}55'27''$; *Marion, Lutheran Church, spire*, $2\frac{1}{2}$ miles, $134^{\circ}04'15''$; west chimney of house of William Staats, one-fourth mile, $186^{\circ}22'50''$. In 1924 *Herndon Hill (U.S.G.S.)* (see description thereof), tablet on iron pipe, was reported 2 feet west of lone, small, nearly dead, oak tree, and 4.309 meters (14.14 feet) from station in azimuth $309^{\circ}30'$. Elevation of station, 214.4 meters (703 feet).

Central (Guadalupe County, O. W. Ferguson, 1903).—About $6\frac{1}{2}$ miles S. 50° W. from Seguin and about 125 meters (410 feet) north of the "South Road" leading from Seguin to San Antonio, in a mesquite pasture, on land belonging to Mrs. Heinrich Beoker. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is of same type as surface mark, is described in note 45, and is between two large mesquite trees, 24.556 meters (80.56 feet) from the station in azimuth $152^{\circ}23'$. These trees were marked by triangles cut into them. One, about 1 foot in diameter, is 1.831 meters (6.01 feet) northeast of the reference mark, and the other, about 7 inches in diameter, is 1.784 meters (5.85 feet) southwest. The chimney of a house about 800 meters (2,625 feet) distant is in azimuth $17^{\circ}11'39''$. The chimney at east end of Mrs. Beoker's house, about 140 meters (459 feet) distant, is in azimuth $128^{\circ}22'23''$. The east gable of Mrs. Beoker's new barn, at the end of the ridge, about 100 meters (328 feet) distant, is in azimuth $141^{\circ}13'57''$. Elevation of station, 201.3 meters (660 feet).

Thomas (Guadalupe County, W. H. Burger, 1903; 1932).—Eleven miles by road south by east from Seguin, the nearest railroad town, 270 paces N. 62° E. (magnetic) from Thomas Springs (only a water hole), well known for miles around, and just inside pasture of William Brodt, of Seguin, near gate giving entrance to pasture and road leading to house of William Oliver, who lives about one-fourth mile east. Station is 74 paces S. 65° E. (magnetic) from northwest corner post of pasture. Hill is cleared, except for large trees, to north and west pasture fences in neighborhood of station. Fine white sand is in abundance. To reach from "Thomas water hole," an old and well-known landmark, go to northeast corner of clearing and follow most southern of group of trails leading east. Station is approximately 264 feet from corner on north edge of this trail. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is of same type as surface mark, is described in note 45, except that it has no nail; and is about $1\frac{1}{2}$ feet north of north fence line of pasture, 82 paces east along fence line from northwest corner near gate, 50.873 meters (166.91 feet) from station in azimuth $200^{\circ}23'$ and about one-half foot higher. The following distances and azimuths are from station: West gable of house of James Pruitt, 1 mile, $82^{\circ}18'18''$; west gable of house of William Oliver, one-half mile, $273^{\circ}27'12''$; *Steins, church, spire*, $6\frac{1}{2}$ miles, $121^{\circ}50'47''$; *Marion, Schultz & Dreyer's cotton gin, stack*, 4 miles, $101^{\circ}10'50''$. Elevation of station, 227.4 meters (746 feet).

Lavernia (Wilson County, O. W. Ferguson, 1904; 1932).—About $3\frac{3}{4}$ miles by road southwest from Lavernia, in the Howard pasture on the southern end and highest point of a sand ridge covered with oak, hickory trees, and brush. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is 30.071 meters (98.66 feet) from the station in azimuth $158^{\circ}50'$. Other distances and azimuths from the station are as follows: Three post-oak trees deeply marked with 6-inch triangles on the sides facing the station, one 11 inches in diameter, 16.33 meters (53.6 feet), 292° ; one 7 inches in diameter, 15.63 meters (51.3 feet), 336° ; and one 16 inches in diameter, 5.02 meters (16.5 feet), 92° ; large stone chimney of a dwelling house beyond Lavernia, about 4 miles, $222^{\circ}38'37''$; stone chimney of dwelling house, about 3 miles, $73^{\circ}37'19''$. Elevation of station, 237.8 meters (780 feet).

Stockdale (Wilson County, W. H. Burger, 1904).—Two miles northeast of the town of Stockdale, about 200 meters (656 feet) south of the Stockdale and Union Valley road and almost in the center of a large cotton field belonging to Mr. Richmond Strand, who lives in the edge of the field about 250 meters (820 feet) northeast of the station. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, and is described in note 45. It is practically at the same elevation as the station, and is 20.542 meters (67.39 feet) from the station in azimuth $345^{\circ}18'$. Other distances and azimuths from the station are as follows: Northeast gable of Mrs. M. S. West's house, one-tenth mile, $18^{\circ}21'53''$; spire of Stockdale public school, $59^{\circ}29'50''$; south gable of Mr. Strand's house, one-eighth mile, $231^{\circ}29'51''$; south gable of Nat Luker's house, one-fourth mile, $329^{\circ}09'45''$. From the reference mark the azimuths of these objects are as follows: Northeast gable of Mrs. M. S. West's house, $19^{\circ}52'48''$; spire of Stockdale public school, $59^{\circ}48'53''$; south gable of Mr. Strand's house, $228^{\circ}24'58''$; south gable of Nat Luker's house, $328^{\circ}43'42''$. Elevation of station, 170.4 meters (559 feet).

Serita (Wilson County, O. W. Ferguson, 1904).—About $1\frac{1}{2}$ miles S. 72° W. from the Marcelena post office, $4\frac{1}{2}$ miles N. 40° E. from Floresville, and about 125 meters (410 feet) northwest from the Floresville and Marcelena wagon road, upon what is known as Serita Hill, on land owned by Mr. James, of Floresville, and rented in 1903 by G. W. Holder. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is 13.010 meters (42.68 feet) from the station in azimuth $349^{\circ}45'$. An oak tree 17 inches in diameter and bearing a 7-inch triangle cut in its side is 8.862 meters (29.07 feet) N. 33° W. from the station. A post-oak tree 1 foot in diameter is 4.308 meters (14.13 feet) N. 80° E. from the station. The following distances and azimuths are from the station: Center of top of large stone chimney on the house of G. W. Holder, about one-fourth mile, $61^{\circ}03'18''$; stone chimney on house of Clarence Noble, about 700 meters, (2,297 feet), $85^{\circ}32'11''$; brick chimney on house of Sam Newman, about 1 mile, $123^{\circ}08'21''$. In 1931 station marks reported destroyed by treasure hunters; hole left at station lined with stones. Reference mark recovered. Elevation of station, 180.7 meters (593 feet).

Ruckman (Karnes County, W. H. Burger, 1904).—About 14 miles by road northeast of Karnes City, 7 miles northeast of Helena post office, and 3 miles east of south of Radford post office, in a 7,000-acre pasture owned by John Ruckman, postmaster and merchant in Helena. The station is 402 paces east of the corner at a gate on the Riddleville-Runge road, 2 miles south of the house of W. H. Patten, and 95 paces from the Helena and Gonzales wagon road leading through the pasture; these two roads meet about 300 feet south of the station. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is 37.478 meters (122.96 feet) from the station in azimuth $177^{\circ}11'$. The following distances and azimuths are from the station: Southwest gable of August Wagonshein's house, $2\frac{1}{2}$ miles, $195^{\circ}07'18''$; chimney on Albert Gerhart's house, 2 miles, $265^{\circ}03'10''$; tall gatepost 2 miles south of W. H. Patten's, 95 paces, $93^{\circ}10'$; smokestack on cotton gin at Radford post office, 3 miles, $114^{\circ}25'47''$. In 1931 it was reported that the general reference was still good but the location references were not so good because of the abandonment of trails, and the construction of new roads. The station marks were not recovered, having been dug up and destroyed. The reference mark was recovered

For notes in regard to marking of stations see p. 154.

in good condition. It is 46 feet north of the center line of an east-and-west road dividing the Ruckman (on south) and Korth (on north) ranches. It is on top of a hill one-half mile east of a north road leading to a cotton gin $1\frac{1}{2}$ miles northwest of station. Elevation of station, 147.1 meters (483 feet).

Karnes (Karnes County, W. H. Burger, 1904; 1931).—About three-fourths mile southwest of Karnes City, 125 paces south of Karnes City and Campbellton wagon road, on land belonging to Robert Salge, in 1904, and 16.93 meters (55.5 feet) southwest of the southwest corner of his yard. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is of same type as surface mark, note 45, and is near southeast corner of Mr. Salge's yard, 0.08 meter (0.3 foot) east from east fence, 0.46 meter (1.5 feet) south from south fence, and 30.024 meters (98.50 feet) from station in azimuth $283^{\circ}09'$. The following distances and azimuths are from station: Southwest gable of Mr. Salge's house, 26.91 meters (88.3 feet), $253^{\circ}18'$; *Karnes City, courthouse steeple*, $234^{\circ}05'43''$. Latitude station established in 1905 was 4.84 meters (15.9 feet) due east of triangulation station and was marked by wooden pier. In 1931 station reported in good condition, both surface and reference marks being recovered. Station was 41.5 feet approximately southwest of 14-inch mesquite tree, the only tree in immediate vicinity. Elevation of station, 140.6 meters (461 feet).

Choate (Karnes County, W. H. Burger, 1904; 1932).—About 12 miles by road southeast of Kenedy, $3\frac{1}{2}$ miles by road south of Choate post office, and one-third mile southwest of Mr. W. R. Scogin's house, in a pasture owned by Mrs. McKenney, or her daughter, Mrs. W. R. Scogin. The station is on the highest part of a small hill covered with brush and about 415 paces west of south from the gate leading from Mrs. Scogin's house lot into the pasture. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and about 2 feet lower than the station and 17.830 meters (58.50 feet) from it in azimuth $269^{\circ}15'$. The following azimuths are from the station: Chimney of W. R. Scogin's house, distant 500 yards, $200^{\circ}04'43''$; chimney of J. L. Teas' house, distant three-fourths mile, $227^{\circ}48'40''$; chimney of Oscar Davenport's house, distant 1 mile, $309^{\circ}27'44''$; smokestack on gin at Choate post office, distant 3 miles, $162^{\circ}47'55''$. In 1929 and in 1931 reported that both station and reference marks had apparently been dug up and destroyed by treasure seekers. Reference mark found broken in small pieces. In 1931 station best reached by going approximately 3 miles southeast on highway from Choate to first southwest road, past red cotton gin, thence 2.5 miles on southwest road to brush-covered ridge on northwest side of road. Station is on highest point at most northern point of ridge. In 1932 underground mark reported only mark in place. Further described as being approximately 1,000 feet west of north-and-south offset in north fence of McKenney-pasture; 2,750 feet west of Pettus-Choate post-office road; approximately 2,800 feet west of west fence line of the Dela Santos 99-acre tract; and approximately 2,500 feet west of southeast boundary line of Karnes County. Elevation of station, 126.8 meters (416 feet).

Bryde (Karnes County, W. H. Burger, 1904).—About $6\frac{1}{2}$ miles by road south by west of Kenedy, in and near the south side of a pasture in 1904 belonging to D. McBryde and about three-fourths mile south of his house. The station is on a ridge, known to old settlers as the "Divide", which is 5 minutes walk almost due east from a large tank on a draw one-half mile southeast of McBryde's house. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is 36.235 meters (118.88 feet) from the station in azimuth $275^{\circ}13'$, and 24.006 meters (78.76 feet) west of the fence separating McBryde's pasture from the cotton field of T. D. Puckett at a point 90 paces south from the gate in the fence. The following distances and azimuths are from the station: T. D. Puckett's windmill, distant three-fourths mile, $280^{\circ}34'22''$; Mrs. Andy William's windmill, distant three-fourths mile, $343^{\circ}48'09''$; largest chimney on the house of D. McBryde, distant three-fourths mile, $158^{\circ}57'39''$. In 1931 reported that mark had been dug up and had been in yard of place belonging to L. W. Scott. Reference mark not recovered. Large tank recovered. The McBryde house now belongs to Jones. Elevation of station, 159.4 meters (523 feet).

Pettus (Bee County, W. H. Burger, 1904; 1931).—About $2\frac{1}{2}$ miles northeast of Pettus on a brush and timber-covered ridge in a pasture owned by George A. Ray, who lives 1 mile southwest of Pettus. The station is $1\frac{1}{2}$ miles by road

southwest of Sam Porter's house, 17 paces north of the wagon road from his place to Pettus and 18 meters (59 feet) north of a fence. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is just inside the fence line at the same elevation as the station and 38.740 meters (127.10 feet) from it in azimuth $4^{\circ}29'$. The azimuth from the station to the west chimney of Bob McKenney's house, distant three-fourths mile, is $202^{\circ}46'04''$, and to the chimney over the west gable of Sam Porter's house, distant 1 mile, is $225^{\circ}48'15''$. In 1929 it was reported that "the station mark has been dug from the ground and broken into many small pieces. The reference mark which is now under a small bush is still intact." In 1931 above report confirmed. Reference mark recovered; it is just inside fence, 434 feet northeast along road from United Gas Pipe Line marker post, which is on north-west side of road. In 1931 reached by going northeast from Pettus, about three-fourths mile, to first left-hand road, thence along this road 8,833 feet, at which point the station is 70 feet northwest of center line of road. Elevation of station, 136.1 meters (447 feet).

Borroum (Bee County, W. H. Burger, 1904).—About 2 miles south of Caesar post office, one-half mile east of the road from Caesar post office to Mineral post office, and about 7 miles by road west of Pettus, on a brush-covered ridge in a large pasture owned by Mr. P. Borroum and 1 mile south of his house. The station is on the highest part of a semibare spot on the crest of the ridge, which is surrounded by large live-oak trees. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is same type as surface mark, is described in note 45, and is at practically the same elevation as the station and 35.340 meters (115.94 feet) from it in azimuth $181^{\circ}30'$. The following distances and azimuths are from the station: Rutherford's windmill, $1\frac{1}{4}$ miles, $63^{\circ}04'57''$; Caesar post office chimney, 2 miles, $181^{\circ}13'35''$; windmill of Mr. Borroum, in pasture near tank, $1\frac{1}{4}$ miles, $192^{\circ}24'31''$; chimney on Will Fox's house, three-fourths mile, $314^{\circ}43'02''$. Elevation of station, 147.9 meters (485 feet).

Wiess (Bee County, W. H. Burger, 1904; 1932).—About 11 miles by road north of Beeville, $5\frac{1}{2}$ miles by road northeast of Normanna, and 1 mile west of H. Philip's house, in a large pasture in 1904 owned by V. Wiess, who lived in Beaumont. The Beeville and Charco road passes through the eastern part of this pasture. The station is on a ridge covered with live-oak trees and brush and forming the divide between Blanco and Medio Creeks, and is about 3.3 miles due east of station Tuleta of the San Antonio & Aransas Pass Railway Co. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is at the same elevation as the station, and 24.150 meters (79.23 feet) from it in azimuth $220^{\circ}33'$. The following distances and azimuths are from the station: Cupola on ranch house (V. Wiess' Blanco farm), $1\frac{1}{4}$ miles, $251^{\circ}07'59''$; west gable of H. Philip's house, 1 mile, $287^{\circ}29'52''$; chimney of J. J. Berkland's house, $1\frac{1}{4}$ miles, $358^{\circ}21'00''$. In 1929 this station was recovered by a local engineer. In 1931 station mark reported in good condition. In 1931 station was reached from Tuleta railroad station by going 0.3 mile south to railroad crossing, thence along road to east 3.96 miles (by speedometer). Station is 90 feet north of center line of road at this point, and in a small clearing. In 1932 station and reference marks recovered in good condition. Station further described as being 90.9 feet north of Bee County road running S. $70^{\circ}55'$ E. through the central portion of Mrs. Laura E. Wiess' pasture, and approximately 5,250 feet N. $70^{\circ}55'$ W. from the intersection of that road with the Beeville-Charco road. Elevation of station, 109.7 meters (360 feet).

Fleming (Bee County, W. H. Burger, 1904; 1932).—Eleven miles by road west-northwest of Beeville, 3 miles N. 38° E. of Cadiz post office, on a ridge covered with small brush in a pasture in 1904 belonging to the Flemings. To reach the station from Beeville, follow the Beeville and Mineral wagon road for 7 miles to Carter's windmill, which stands close to and on the right-hand side of the road; pass through a gate on the left and opposite the windmill and follow the main road for 2 miles to a cross lane; turn to the right 200 yards and pass in a gate on the left at the house of William Chandler; follow the main road passing about 150 yards to the right of the house and go southwest about 1 mile, passing through two gates into the Fleming pasture. After passing through the second gate, turn to the right and the station is 1 mile distant on top of a ridge. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar

to surface mark, note 36. Reference mark, also of same type as surface mark is described in note 45, and is at the same elevation as the station and 27.385 meters (89.85 feet) from it in azimuth $166^{\circ}57'$. The following distances and azimuths are from the station: Gin stack at Cadiz post office, 2 miles, $35^{\circ}44'42''$; east chimney of Howard West's house, $1\frac{1}{4}$ miles, $184^{\circ}46'39''$; Williams' gin stack, 1 mile, $244^{\circ}02'13''$; *Beeville water tower*, 11 miles, $289^{\circ}26'45''$; chimney of William Chandler's house, 2 miles, $289^{\circ}57'46''$. In 1931 station mark and reference mark reported destroyed, apparently by treasure hunters. Hole and pieces of mark remain. Reached from the junction of the Beeville, Cadiz and Mineral roads, by going 5.1 miles along the Mineral Road, thence 3 miles along the west road to Wheeler ranch house—the station being on top of ridge about 4,100 feet west of this house. In 1932 surface mark reported gone, but underground mark in place. Further described as being in the pasture of Albert Theis et al (old Fleming pasture); 575 feet southeast from the southeast fence corner of the Ella Quinn pasture; and approximately 800 feet west of west fence line of the Will Williams pasture. Elevation of station, 133.1 meters (437 feet).

Beeville (Bee County, W. H. Burger, 1904; 1932).—About $4\frac{1}{2}$ miles N. 25° W. from Beeville, east of Beeville and Normanna road, in large pasture in 1904 owned by Mrs. Little, who lived in Beeville. On account of heavy sand road separates near station into two parallel roads. Station is 94 paces east of nearer and 132 paces east of other of these two branches. To reach from Beeville and Normanna road, which, about $3\frac{1}{2}$ miles out, passes into Mrs. Little's pasture; go 1 mile farther along road and station site will be on ridge to right, about one-fourth mile before road crosses railway track. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, note 45, is 3 feet lower than station and 47.098 meters (154.52 feet) from it in azimuth $7^{\circ}02'$. Following distances and azimuths are from station: Southeast gable of Sid. Dugat's barn, one-half mile, $148^{\circ}39'11''$; tallest chimney on Mrs. Little's house, five-eighths mile, $280^{\circ}19'07''$; *Beeville water tower*, 4 miles, $331^{\circ}46'14''$; Jones' (Captain) house, tallest cone, 2 miles, $325^{\circ}43'27''$. In 1932 recovered in good condition. Further described as being approximately 125 feet west of Beeville-San Antonio road; in pasture of Mrs. Emma Little, 800 feet north of south fence line of pasture, 2,600 feet south of north fence line of pasture, and 250 feet northeast of large meeting hall. Elevation of station, 100.8 meters (331 feet).

Miller (Bee County, W. H. Burger, 1904; 1932).—Nine miles by road southwest of Beeville, on the east fence line of the Beeville-Almos schoolhouse, and Mathis wagon road, on the west side of a large pasture in 1904 owned by I. J. Miller, cashier of the Commercial Bank of Beeville. This pasture is known as the Berry pasture, having been owned previously by P. H. Berry, proprietor of a livery and feed stable in Beeville. The station is 1.55 meters (5.1 feet) west of the east fence of the lane, 35.440 meters (116.27 feet) north of the south boundary of the Berry pasture, and 198 paces south of the gate opening into the pasture. To reach the pasture from Beeville, follow the road to Clareville for $4\frac{1}{2}$ miles to the second lane on the left, then go due south $4\frac{1}{2}$ miles to the station. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as surface mark, is described in note 45, and is at the same elevation as the station, and 48.403 meters (158.80 feet) from it in azimuth $180^{\circ}22'$. The following distances and azimuths are from the station: Southeast chimney of J. G. Roundtree's house, $1\frac{1}{4}$ miles, $56^{\circ}32'30''$; *Clareville, gin stack*, $3\frac{1}{4}$ miles, $110^{\circ}51'41''$; largest chimney on Bud Clare's house, $1\frac{1}{4}$ miles, $243^{\circ}56'21''$; and *Beeville water tower*, 8 miles, $208^{\circ}05'41''$. In 1906 latitude observations were made on a wooden pier placed 4.50 meters (14.8 feet) due west of the triangulation station and very nearly in the center of the north and south lane. In 1931 station recovered. Pasture of 1904 is now a field, the station being on top of hill, 116.27 feet north of fence line, and 19 feet east of center line of road. The lanes of 1904 are now public roads. In 1932 recovered in good condition. Further described as being 25.1 feet east of center line of Beeville, Almos, and Mathis wagon road, 4.8 feet west of west fence of Miller pasture, and 2,043 feet north of T-road to west between the Wm. Fehler and Roundtree pastures. Elevation of station, 72.3 meters (237 feet).

O'Neill (Bee County, W. H. Burger, 1904; 1932).—Seven miles by road southeast of Beeville, on a ridge covered with brush and mesquite trees, 700 paces east of the San Antonio and Aransas Pass Railway, in a large pasture in 1904 owned by George B. O'Neill, and $1\frac{1}{4}$ miles southwest of his house. Surface mark

is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and is at the same elevation as the station and 31.037 meters (101.83 feet) from it in azimuth $122^{\circ}26'$. The following distances and azimuths are from the station: Windmill on William O'Neill's ranch, three-fourths mile, $36^{\circ}39'00''$; chimney on Vego Kohler's ranch house, $1\frac{1}{2}$ miles, $149^{\circ}45'45''$; George B. O'Neill's windmill, $1\frac{1}{4}$ miles, $216^{\circ}06'15''$; *Beeville water tower*, $5\frac{1}{2}$ miles, $154^{\circ}34'55''$. In 1932 station recovered in good condition. Further described as being in the pasture of Mrs. F. Hrdina, 592 feet south of the north fence of the Hrdina 200-acre tract; approximately 700 feet east of power line from Beeville to Skidmore; approximately 2,000 feet east of center line of the San Antonio and Aransas Pass Railway tracks. The Hrdina tract north fence is 1,339 feet north of railway milepost no. 99. Elevation of station, 58.1 meters (191 feet).

Skelly (Bee County, W. H. Burger, 1904; 1931).—Nine miles by road west-southwest of Skidmore, one-half mile south of J. M. Shelly's ranch house and in a pasture purchased from Mr. Shelly by Fritz Bremer. The station is located in a small inclosure in which stands a windmill; it is 52 meters (171 feet) northeast of the windmill, 126 paces north-northwest of Mr. Bremer's house, 4.62 meters (15.2 feet) west of east fence of lot, and 120 paces east of the gate on the west side of the lot leading to Mr. Shelly's house. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and is 0.50 meter (1.6 feet) west of the east fence of the inclosure, is at the same elevation as the station and 21.242 meters (69.69 feet) from it in azimuth $165^{\circ}51'$. The following distances and azimuths are from the station: Windmill of Mrs. Brown (who lives in Mr. Shelly's house), one-fourth mile, $170^{\circ}23'30''$; chimney on Fritz Bremer's house, 126 paces, $338^{\circ}16'$; *Mathis Methodist Church, spire*, 8 miles, $12^{\circ}06'36''$. In 1931 station was recovered and further described as being in a cotton field, 7 miles north-northeast of Mathis, near northwest corner of Fritz Bremer's farm, about 3,000 feet north along road from Catholic Church, 329 feet east of center line of road, and 918 feet south of north fence line of Fritz Bremer's farm. Elevation of station, 64.6 meters (212 feet).

Welder (Bee County, W. H. Burger, 1904).—About 5 miles (7 miles by road) south-southeast of Skidmore, $2\frac{1}{2}$ miles south of Corpus Christi branch of San Antonio & Aransas Pass Railway, 2 miles south of Pete Boale's house, in large pasture owned by J. J. Welder, who lives in Victoria. Station is about 300 paces east of road leading south through the Welder pasture, which abounds in mesquite and live oak, and 63.50 meters (208.3 feet) from large gate leading into lot where windmill and tank are located. This gate is 124 paces from windmill. To reach from Skidmore, follow road along south side of Corpus Christi branch of San Antonio & Aransas Pass Railway almost to milepost 4 from Skidmore, go through wire gate to south, then south about three-fourths mile, and, just before reaching creek near Pete Boale's house, turn to right and pass through wire gate, thence 2 miles south to station site. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, note 45, and is at same elevation as station and 28.997 meters (95.13 feet) from it in azimuth $17^{\circ}52'$. Following distances and azimuths are from station: *Skidmore, Baptist Church, spire*, 5.5 miles, $165^{\circ}17'34''$; *Skidmore, Methodist Church, spire*, 5.6 miles, $165^{\circ}28'09''$; *Skidmore, Catholic Church, spire*, 5.8 miles, $165^{\circ}32'01''$; Pete Boale's windmill, 2 miles, $214^{\circ}21'22''$; windmill, 190 paces, $336^{\circ}42'11''$; John Carlyle's house, west gable, 2 miles, $322^{\circ}27'06''$; F. Skidmore's house, south chimney, 2 miles, $103^{\circ}25'48''$; A. C. McFall's house, chimney, 1 mile, $119^{\circ}26'35''$; Skidmore, railroad water tank, $163^{\circ}30'25''$. Elevation of station, 33.5 meters (110 feet).

Mathis (San Patricio County, W. H. Burger, 1904).—In the east corner of lot 10, block 15, of the village of Mathis, on land belonging to S. G. Borden, who lives in Sharpsburg, Tex., and whose agent in Mathis is A. B. Watts, Jr. The station is 5.14 meters (16.9 feet) northwest of the southeast fence line of the lot and 30.01 meters (98.5 feet) northeast of the southwest fence line; Bee Street runs along the southeast side of the lot and San Patricio Avenue along the southwest side. The station is 130 paces southeast of the railway track. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and is in the south corner of lot 10, 0.36 meter (1.2 feet) from the fence line of Bee Street, 0.79 meter (2.6 feet) from the fence line of San Patricio Avenue,

and 29.542 meters (96.92 feet) from the station in azimuth $30^{\circ}30'$. Following distances and azimuths are from station: Mathis, railway station, ornament over gable facing track, 144.46 meters (473.9 feet), $102^{\circ}07'28''$; *Mathis, gin stack*, 178.3 meters (585 feet), $199^{\circ}06'46''$; *Mathis, Methodist Church, spire*, 301.8 meters (990 feet), $109^{\circ}46'13''$. Elevation of station, 48.7 meters (160 feet).

Nolan (San Patricio County, W. H. Burger, 1904).—Nine miles southeast from Mathis, one-fourth mile north of the Mathis and Sinton wagon road, in a pasture owned by Christopher Nolan, who now lives in San Patricio. The station is 41.70 meters (136.8 feet) northwest of Mr. Nolan's ranch house, near his stock pens, 85 paces northwest of his windmill, and 6.75 meters (22.1 feet) north of the fence on the south side of the pasture. To reach the station from Mathis follow the Mathis and San Patricio road for about 4 miles to a large bridge, crossing which, take the middle of three roads, which in half a mile, just before reaching a farmhouse, branches, one branch going east and the other south along a lane; follow the south road, passing through a gate at its southern end, then take the left-hand road, which is the Sinton Road, and follow it for 4 miles; take road to left one-fourth mile to Mr. Nolan's house, and station site. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is similar to surface mark, is described in note 45, and is 10.52 meters (34.5 feet) north of the gate leading from the stock pens to the pasture, 0.47 meter (1.5 feet) west of the east fence of the pasture in which the station is located, and 44.573 meters (146.24 feet) from the station in azimuth $238^{\circ}50'$. The following azimuths and distances are from the station: Windmill in Harry Timon's pasture, one-half mile, $29^{\circ}08'01''$; windmill in Welder pasture, 2 miles, $259^{\circ}54'57''$; Mr. Nolan's windmill, 85 paces, $309^{\circ}29'$; *Mathis, Methodist Church, spire*, 8.9 miles, $133^{\circ}15'49''$. Elevation of station, 32.2 meters (106 feet).

Elliff (Jim Wells County, W. H. Burger, 1904; 1930).—About 9 miles west-northwest of Robstown and 2 miles north of Banquete, on land owned by S. W. Cheeves, of Cameron, Tex., and farmed by E. G. Brown, 50 yards southwest of Brown's house, in a barn lot, 16 yards southwest of a gas pump, 27 yards east by south of a wooden tank and windmill, and 1 foot east of west post of wire gap leading into field to south. In 1904 described as being 44.94 meters (147.4 feet) in azimuth $62^{\circ}10'$ from the southwest corner of J. A. Elliff's house, probably same house as above. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and is at the same elevation as, and 30.362 meters (99.61 feet) from station in azimuth $235^{\circ}13'$. In 1930 it was reported as being covered by a mound of blow sand and near a woodpile. In 1904 it was reported as being 15.17 meters (49.8 feet) southwest of southwest corner of house. Other distances and azimuths (1904) were: Chimney of C. C. Wright's house, three-fourths mile, $307^{\circ}49'37''$; chimney on Banquete railway station, 3 miles, $358^{\circ}02'37''$; *Banquete, Cyrus Elliff's house, chimney*, $8^{\circ}37'57''$. In 1930, reached from Robstown by route no. 12A about $7\frac{1}{2}$ miles to Banquete; thence north on dirt road toward Mathis 2.1 miles to gate on left at lane leading west to house on hill; thence along lane 0.3 mile to house and station site (as described above). Elevation of station, 31.1 meters (102 feet).

Reynolds (Jim Wells County, W. H. Burger, 1904; 1932).—Three and one-half miles northeast of Alfred railway station, one-half mile northeast of Reynolds switch, 339 paces east of the San Antonio & Aransas Pass Railway, in a pasture in 1904 belonging to George J. Reynolds, and three-eighths mile north of his house. The station is 27.52 meters (90.3 feet) west of the west fence of a cotton field and 352 paces north of its southwest corner. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 46. Reference mark also is of same type as surface mark, is described in note 45, and is at the same elevation as the station, 0.30 meter (1.0 foot) west of the cotton-field fence and 27.221 meters (89.31 feet) from the station in azimuth $296^{\circ}40'$. The following distances and azimuths are from the station: Chimney on Alfred railway station, $3\frac{1}{2}$ miles, $33^{\circ}17'37''$; chimney on E. E. Miller's house, one-half mile, $281^{\circ}55'27''$; chimney on George J. Reynolds' house, three-eighths mile, $12^{\circ}51'27''$. In 1932 surface and reference marks were reported destroyed, but underground mark was recovered intact, $3\frac{1}{2}$ feet below the surface. It is in a cotton field belonging to George J. Reynolds, Jr., and is 989.8 feet from a roofing nail in a cross tie on center line of the San Antonio & Aransas Pass Railway. This tie is 1,663 feet south of milepost no. 28, and 2,205 feet south of crossing of center line of United Gas System pipe line and railroad. The angle at nail

between center line of railway to north and station is $89^{\circ}20'$. Station is 870 feet from fence line on east side of State Highway 12 (Alice-Mathis paved road) at a point in line with above cross tie, which point is 370 feet north of one iron pipe in fence line, and 1,447 feet north of another iron pipe (1-inch) and large stone placed at end of original Reynolds fence. A fence line coming from first pipe passes 260 feet south of station. Elevation of station, 57.3 meters (188 feet).

Alice (Jim Wells County, W. H. Burger, 1904; 1906).—In South Heights addition to town of Alice, one-third mile south of Texas Mexican Railway track, about one-eighth mile east of San Antonio and Aransas Pass Railway track on vacant lot, in 1904 belonging to the Alice Land Co., of which F. B. Nayer was manager. Station stands close to edge of Cactus Avenue, which runs east and west, but has not been fenced, and between King Street on west and Wright Street on east. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark is also of same type as station mark, note 45, and is at southwest corner of house lot of Mrs. E. McKenzie, 0.23 meter (0.8 foot) south of south fence of lot, 0.70 meter (2.3 feet) east from its southwest corner, at same elevation as station, and 53.820 meters (176.57 feet) from it in azimuth $165^{\circ}18'$. Following distances and azimuths are from station: Chimney on F. W. Ellis' house, on opposite side of King Street, $56^{\circ}24'$; northeast fence corner of F. W. Ellis' house lot, 36.93 meters (121.2 feet), $59^{\circ}59'$; southeast corner post of vacant lot across King Street from Mrs. McKenzie's house, 61.88 meters (203.0 feet), $147^{\circ}59'$; south gable of Mrs. E. McKenzie's house, $176^{\circ}10'50''$; Methodist Church spire, $192^{\circ}01'38''$; Alice, schoolhouse spire, $195^{\circ}03'23''$; Alice, Walters & Co.'s gin, stack, 5.5 miles, $119^{\circ}10'17''$; Parkman's gin, stack, 0.7 mile, $168^{\circ}49'44''$. In 1905 latitude observations were made from a wooden pier situated 9.03 meters (29.6 feet) due east of triangulation station. Longitude station established in 1906 was 0.814 meter (2.67 feet) due north of triangulation station, and was marked by concrete pier 16 by 26 inches, $2\frac{1}{2}$ feet in ground and $2\frac{3}{4}$ feet above ground. Elevation of station, 62.9 meters (206 feet).

Wood (Jim Wells County, W. H. Burger, 1904; 1913).—Nine miles S. 87° E. of Alice, $3\frac{1}{2}$ miles south of the Texas Mexican Railway, in a large pasture in 1904 owned by John H. Wood who lived in Beeville and leased to a Frank A. Welder, of Victoria. The station is near a windmill and circular tank in the pasture, being 35.75 meters (117.3 feet) from the windmill, in azimuth $25^{\circ}28'$, and 22.50 meters (73.8 feet) from the nearest edge of the tank. The tank and windmill are on a small ridge and are inclosed in a fence. Surface mark is nail in iron pipe set in concrete, note 26. Underground mark is similar to surface mark, note 36. Reference mark also is of same type as surface mark, is described in note 45, and is in the south corner of the inclosure in which the windmill stands, 2.87 meters (9.4 feet) from the windmill, and 33.738 meters (110.69 feet) from the station in azimuth $209^{\circ}15'$. The following azimuths are from the station: Alice Methodist Church spire, $101^{\circ}20'46''$; chimney on large ranch house, distant 4 miles, $9^{\circ}33'45''$; Wood's ranch house, cupola, 2.8 miles, $157^{\circ}10'08''$. In 1913 reference mark was not recovered, as the circular tank, or water hole, had been cleaned out and the mark was deeply covered with dirt. The windmill was still standing, but was no longer enclosed by fence. Elevation of station, 40.5 meters (133 feet).

Alice east base (Jim Wells County, A. L. Baldwin, 1900; 1913).—About $10\frac{1}{2}$ miles by road southeast of Alice, 2 miles east of the Alice and Brownsville road in one of the King pastures on a slight elevation. To reach the station from Alice, follow the Brownsville road for $8\frac{1}{4}$ miles to a point one-fourth mile beyond the gate leading west to Joe Garcia's and about one-half mile nearer than the gate beyond the bridge at the end of the lane; go through the fence and proceed almost due east to the east side of the pasture owned by the Garcia Bros., pass through a gate, and the station is one-half mile distant on a slight elevation. Surface mark is old type station mark set in a limestone block 24 inches square and 14 inches deep, which is embedded in a mass of concrete 48 inches square and 22 inches deep. Underground mark is similar to surface mark, the stone being 6 inches square and 12 inches long, embedded in concrete with its top 24 inches below the top of the surface stone. Reference mark is nail in iron pipe set in concrete. It is described in note 45, and is at the same elevation as the station and 20.765 meters (68.13 feet) from it in azimuth $351^{\circ}41'$. The following azimuths and distances are from the station: Joe Garcia's windmill, $4\frac{1}{2}$ miles, $91^{\circ}15'26''$; Alice Methodist Church spire, $142^{\circ}29'26''$; chimney on large ranch house, $1\frac{1}{2}$ miles, $256^{\circ}54'25''$. Elevation of station, 42.3 meters (139 feet).

Alice west base (Jim Wells County, A. L. Baldwin, 1900; 1932).—Eleven miles by road from Alice, $3\frac{1}{2}$ miles west of the Brownsville and Alice wagon road, on that part of the Coloraras ranch belonging to Luciano Garcia and about 300 yards northeast of his house. To reach the station from Alice, follow the Brownsville road, which runs S. 30° E., for 8 miles to a gate leading west to Joe Garcia's house; this gate is 438 meters (1,437 feet) north of the base line where it crosses the Brownsville road. Passing through the gate go westward about $3\frac{1}{2}$ miles, past the house of Joe Garcia, to the top of a small ridge on which is the station. The station is marked in a manner similar to *Alice east base* (see description thereof). Reference mark is nail in iron pipe set in concrete, and is described in note 45. It is at the same elevation as the station and 36.335 meters (119.21 feet) from it in azimuth $197^{\circ}55'$; it is 18 paces south of the wagon road leading west to several Mexican shacks. The following distances and azimuths are from the station: North gable Mexican shack, one-eighth mile, $70^{\circ}24'06''$; north chimney of ranch house, 3 miles, $155^{\circ}53'43''$; north chimney of Mexican shack, one-eighth mile, $201^{\circ}14'47''$; Joe Garcia's windmill, three-eighths mile, $262^{\circ}49'32''$. In 1932 recovered in good condition. Further described as being approximately 2,646.7 feet east and 3,100 feet north from the extreme northwest corner of Kleberg County; 3,125 feet north of north line of a King Ranch pasture; and 3,440 feet west of field fence running north and south. Elevation of station, 51.8 meters (170 feet).

King (Nueces County, C. V. Hodgson, 1913).—On rather prominent low knoll about $5\frac{1}{2}$ miles from Kingsville, a few meters east of Alice-Kingsville and King ranch wagon road, in pasture owned by Mrs. King. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at same elevation as station mark and almost in line of telephone poles at west side of road, and 16.338 meters (53.60 feet) from station, in azimuth $52^{\circ}26'$. Following distances and azimuths are from station: *Kingsville standpipe*, 5 miles, $296^{\circ}53'03''$. King home ranch, center of square cupola, 3 miles, $328^{\circ}11'41''$. Elevation of station, 38.0 meters (125 feet).

Bishop (Kleberg County, C. V. Hodgson, 1913).—About $1\frac{1}{4}$ miles east and one-fourth mile south from Bishop, in south side of small pasture owned by R. T. Moudy, and about one-fourth mile south of his house, near main road leading east from Bishop. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), in boundary fence line at same elevation as station and 204.29 meters (670.2 feet) from it in azimuth $287^{\circ}36'32''$. Elevation of station, 15.6 meters (51 feet).

Ricardo (Kleberg County, C. V. Hodgson, 1913).—About $6\frac{1}{2}$ miles west and 2 miles south from Ricardo, 7 miles S. 10° W. from the King home ranch, on a small knoll covered with mesquite trees on land owned by Mrs. King. A wind pump at an artesian well is about 1 mile distant, in azimuth $283^{\circ}05'$. No nearby roads open at present. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the same elevation as station mark, and 29.465 meters (96.67 feet) from the station, in azimuth $278^{\circ}05'$. Elevation of station, 31.5 meters (103 feet).

Kleberg ecc. (Kleberg County, C. V. Hodgson, 1913).—An unmarked point, 0.075 meter (0.25 foot) in azimuth $94^{\circ}10'$ from station *Kleberg* (see description thereof). Reference mark for station *Kleberg* is 20.078 meters (65.87 feet) away in azimuth $190^{\circ}17'$.

Riviera (Kleberg County, C. V. Hodgson, 1913).—About 4 miles due west from Riviera, near the center of the top of a rather prominent round knoll, the only elevation of the kind in the vicinity, in pasture land owned by Mrs. King. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the same elevation as station mark, and 30.780 meters (100.98 feet) from the station, in azimuth $265^{\circ}45'$. Elevation of station, 23.5 meters (77 feet).

Robbins (Kleberg County, C. V. Hodgson, 1913; 1931).—About 4.4 miles, in azimuth $261^{\circ}25'27''$ from the *Riviera schoolhouse* and $\frac{3}{4}$ of a mile north of the Riviera Beach Railroad, on land owned by Mr. S. C. Kile, of San Antonio, and rented in 1913 by Mr. Charles Robbins. The southeast corner of Mr. Robbins' house is 22.6 meters (74 feet) from station in azimuth $70^{\circ}53'$. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the

same elevation as the station mark, and 25.442 meters (83.47 feet) from the station, in azimuth $172^{\circ}18'$. In 1931 subsurface mark recovered from station *Robbins eccentric* (see description thereof), which was established 49.728 meters (163.15 feet) away in azimuth $75^{\circ}13'$. Surface and reference marks destroyed. Station is in cultivated field. No new surface mark was set. Elevation of station, 15.6 meters (51 feet).

Roza (Kenedy County, C. V. Hodgson, 1913; 1931).—About 5 miles southwest from Sarita, on the Santa Rosa ranch, owned by McGill Bros., of Alice, in small cultivated field about 300 yards southeast of ranch house and 32 paces southeast of Mexican shack. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set on south side of wire fence, at same elevation as station and 21.120 meters (69.29 feet) therefrom, in azimuth $94^{\circ}12'$. In 1930 and again in 1931 station was recovered. The 1913 reference mark was found tilted toward station, and not stable. Its distance and azimuth in 1931 were 69.04 feet, $94^{\circ}19'$. It was stamped R.M. 3. Two new reference marks were established, standard reference disks in concrete, note 11 (a). No. 1 is one-fourth mile south of ranch house, on east side of line of trees along fence line, and approximately one-fourth mile from station in azimuth $71^{\circ}34'28''$. No. 2 is 90 feet southeast of shack, 5 feet southeast of tree, and 220.7 feet from station in azimuth $148^{\circ}22'$. Following distances and azimuths are from station: *Sarita, water tank, municipal*, 5.5 miles, $230^{\circ}25'59''$; *Airway beacon*, 3.8 miles, $258^{\circ}55'11''$. In 1930 best reached from Riviera by route 16 toward Falfurrias 5.0 miles to Santa Rosa gate on south side of road, thence along lane $6\frac{1}{2}$ miles to ranch. Elevation of station, 24.0 meters (79 feet).

Sarita (Kenedy County, C. V. Hodgson, 1913; 1931).—About 6 miles southeast from Sarita, in one of John Kenedy's pastures, on high sand knoll known locally to range riders as La Cruz, owing to its being at intersection of two ridges. Knoll is covered with live-oak bushes and surrounded by live-oak timber for several miles, being about 2 miles from north edge of timber. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), 16.44 meters (53.9 feet) horizontal distance from station and 3.45 meters (11.3 feet) below it in azimuth $293^{\circ}06'$. Azimuth from station of *Sarita, water tank, municipal*, distant 6 miles, is $141^{\circ}41'08''$. In 1930 and again in 1931 station was recovered, mark in good condition. Reference mark was searched for in 1930 but not found. Description of route to reach station is very involved, and guide should be secured. Elevation of station, 23.4 meters (77 feet).

Robbins ecc. (Kleberg County, F. L. Gallen, 1931).—About $4\frac{1}{2}$ miles east of Riviera, a town on paved road (route 16). Reached from Riviera by dirt road east toward Riviera Beach, 4.5 miles to section-line road leading north; follow this road north 0.6 mile to lane leading east; follow lane east 0.3 mile to tenant house on top of hill and south of lane. Station is 91 feet south of house and just north of small outbuilding near highest part of hill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 2 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 4 inches above ground, is 75 feet south of lane leading east, 20 feet west of house, and 91.50 feet from station, in azimuth $175^{\circ}31''$. No. 2 projects about 8 inches above surface, is at the corner of field where lane leads east from road to station, 26 feet east of center line of road, 14.3 feet south of northwest corner of fence, 0.9 feet west of fence line, and about 0.3 mile from station, in azimuth $98^{\circ}08'40''$. Following azimuths are from station: *Sarita, water tank, municipal*, distant about $6\frac{1}{2}$ miles, $30^{\circ}13'42''$; *German Catholic Church, steeple*, distant about 2 miles, $161^{\circ}04'31''$. Station *Robbins* (see description thereof) is 49.728 meters (163.15 feet) from station in azimuth $255^{\circ}13'$.

Pasadiso (Kenedy County, P. M. Trueblood, 1912; 1931).—About 10 miles northeast of Sarita and 4 miles northeast of Kenedy ranch house (La Parra), on southwest shore of Baffins Bay, on a small hard clay hill, on the south side of Baffins Bay, about one-fourth mile northwest from Kenedy's wharf and boat-house, 150 meters (492 feet) from the shore, 105 meters (344 feet) north of a salt pond, and 200 meters (656 feet) southeast of a small fresh-water pond. To reach from Sarita, go 5.8 miles east on graded dirt road to Kenedy ranch, turn left at ranch office and keep ranch road east, north of mansion bear left to gate just after passing foreman's house. Gate is 0.4 mile northeast of Kenedy's house. Pass through gate and bear right (east) past dipping pens on main trail 1.65 miles to

double board gate, here turn right through gate and bear left on main trail 0.7 mile to another board gate, thence northeasterly 3.3 miles to vacant house at old Pasadiso Landing. Turn left here and follow shell ridge near shore, across end of caya to solid ground beyond, and thence northwest to station site, about one-fourth mile northwest of Pasadiso house and landing. Surface mark is standard disk station mark in concrete, note 1 (b). Underground mark is nail in concrete, note 29. Reference mark is standard reference disk in concrete, note 11 (b), about 60 meters (197 feet) from end of high point that projects into salt pond, and 112.75 meters (369.91 feet) from station in azimuth $339^{\circ}42'45''$. Other azimuths are: North gable of Kenedy's warehouse, near wharf, $343^{\circ}32'$; lone Spanish dagger, 400 meters (1,312 feet) distant, $72^{\circ}44'$; Buena Vista Hotel, middle chimney, $141^{\circ}55'$; *Kenedy ranch, water tank*, 3 miles distant, $47^{\circ}11'05''$.

Crawford 2 (Kenedy County, P. M. Trueblood, 1912; 1931).—About 12 miles northeast of Sarita, and 6 miles east-northeast of Kenedy's ranch house, on Kenedy's ranch, on south shore of Baffins Bay, on point that projects into bay, on brush-covered hill about 20 meters (66 feet) from shore and 15 feet high. Station is about 200 meters (656 feet) northwest of pond, dry except in wet weather. Reached from Sarita by way of Kenedy ranch to vacant house at old Pasadiso Landing, thence southeast along shore 1.2 miles to board gate (locked), and from gate along road to southeast 2.3 miles to small triangular mound of sand on left side of road. A large motte of bushes is 100 yards to right, and some prickly pear 6 feet also to right. Station is on small knoll covered with bushes and bears 11° (magnetic) from this point, distant about 0.4 mile. A lagoon is visible in magnetic azimuth 52° . Station is in small motte of brush about 6 feet high and on side facing beach. Surface mark is standard disk station mark in concrete, note 1 (b). Underground mark is piece of brass (instead of nail) in concrete, note 29. Reference mark is standard reference disk in concrete, note 11 (b), 50.42 meters (165.42 feet) from station in azimuth $342^{\circ}59'$. Other azimuths from station are as follows: Tangent to Rabbit Point, $216^{\circ}46'$; lone pita on beach, $227^{\circ}34'$; north gable of Pasadiso freight house, $108^{\circ}00'$; north gable Pasadiso boathouse, $109^{\circ}04'$; *Kenedy ranch, water tank*, distant about 6.5 miles, $75^{\circ}12'49''$.

Turcotte (Kenedy County, C. V. Hodgson, 1913).—About $4\frac{1}{4}$ miles, in azimuth $122^{\circ}22'22''$, from the section house at Turcotte, at the center of the top of a prominent knoll on the north side of a large salt lake, about 10 meters (33 feet) from the top of the bluff at the edge of the lake, and on land owned by John Kenedy. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), 19.640 meters (64.44 feet) from the station in azimuth $82^{\circ}25'$, and 1.22 meters (4.0 feet) below it. Elevation of station, 21.7 meters (71 feet).

Kenedy (Kenedy County, C. V. Hodgson, 1913).—About 3 miles, in azimuth $248^{\circ}29'20''$, from the section house at Turcotte, on a sand knoll in the Kenedy pastures, about 75 meters (246 feet) to the eastward of an old wagon trail leading from the southwest to an artesian well, which is at the north edge of a large thicket of bushes and about three-fourths mile from the station in azimuth $192^{\circ}01'$. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark was probably standard reference disk in concrete, note 11 (b), but was not found in later visits in 1913 and had apparently been covered up with sand. No record of connection to station. Elevation of station, 13.0 meters (43 feet).

Katherine (Kenedy County, C. V. Hodgson, 1913).—About 5 miles from the railroad water tank at Armstrong in azimuth $69^{\circ}15'30''$, on a rounded knoll on the Armstrong pastures and about 1 mile south of an artesian well which is about on the line to *Turcotte* from the station. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the same elevation as the station and 27.280 meters (89.50 feet) therefrom, in azimuth $355^{\circ}09'$. Elevation of station, 10.0 meters (33 feet).

Armstrong (Kenedy County, C. V. Hodgson, 1913).—About 3 miles from the railroad water tank at Armstrong in azimuth $304^{\circ}12'49''$, about 2 miles from the Armstrong ranch house in azimuth $343\frac{1}{2}^{\circ}$, on a sand knoll in the vicinity of a number of shifting sand hills in the Armstrong pastures. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the same elevation as the station and 23.325 meters (76.53 feet) therefrom, in azimuth $341^{\circ}57'$. Elevation of station, 10.0 meters (33 feet).

Vinson (Kenedy County, C. V. Hodgson, 1913; 1931).—About 7 miles west by south from the Norias ranch, on north side of road leading from Norias to the Andres ranch and Huisaches Altos, in the King ranch pastures, whose local headquarters are at Norias. Reached from Norias by passing through gate southwest of house, thence west one-fourth mile toward forks of main road, turning up dim fork to right just before reaching this main fork and proceeding 6.5 miles to station, which is about 50 yards north of the road, near summit of grade where road skirts small salt pond to south, the road crossing over the south end of a rather prominent knoll. Station is near north end of knoll, 6 feet north of small clump of mesquite growing around prickly pear, and 12 feet south of another mesquite, the most northerly tall mesquite on the hill. Norias ranch could be reached in 1930 from Raymondville by way of the Stillman ranch (La Tordilla) and ranch road northeast 18 miles to Norias, or from the west from United States route 96 at a point about 1 mile south of Huisaches Altos ranch, and 2.7 miles south of Brooks-Hidalgo County line. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), 22.454 meters (73.67 feet) from station in azimuth 347°00'. It is at the same elevation as the station. In 1930 marks were recovered, the surface mark extending about 8 inches above ground, and fragments of concrete were piled around it to prevent further erosion. Disks are stamped: 1931. Elevation of station, 14.6 meters (48 feet).

Norias (Kenedy County, C. V. Hodgson, 1913; 1931).—About 3 miles south from Norias ranch railroad station and 250 yards east of the Missouri Pacific Railroad tracks, between mileposts 64 and 65, in the King pastures, on a low brushy knoll. Station reached from Norias by crossing railroad to east side just south of house, turning sharply to right and following sand trail down railroad 3.0 miles to point opposite station. There is a 4- by 4-inch stub on each side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark no. 2 is standard reference disk in concrete, note 11 (b), at the same elevation as the station and 75.84 feet therefrom in azimuth 275°46'. In 1931 disks were stamped "1931" and numbers of reference marks added. A new reference mark, no. 1, standard reference disk in concrete, note 11 (a), was added in 1931; it is 134.45 feet from station in azimuth 178°32'. Azimuth from station of aerial beacon at Norias ranch, distant approximately 3 miles, is 172°44'54". Elevation of station, 10.0 meters (33 feet).

Stillman (Kenedy County, C. V. Hodgson, 1913; 1934).—About 6½ miles west and 4 miles north from Yturria railroad station, 14 miles west of north from Raymondville, 3 miles west of north from the Stillman ranch house, and one-half mile east of wagon road which leads from Raymondville to the Stillman ranch and thence north through the King pastures to the west of station *Vinson*. An old well lined with hewn curved mesquite blocks, surrounded by piles of dirt and a wire fence, is 201.4 meters (661 feet) from the station in azimuth 178°58', and an old road leading to the well is 60 feet to the west of the station. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at the west edge of a small clump of mesquite, about a meter from the nearest tree, at the same elevation as the station, and 23.34 meters (76.6 feet) therefrom in azimuth 259°41'. Elevation of station, 13.9 meters (46 feet).

Yturria (Kenedy County, O. V. Hodgson, 1913; 1931).—About 12 miles south of Norias, 9 miles north of Raymondville, and 3 miles north of Yturria station on the Missouri Pacific Railway, in the Yturria pastures, three-fourths mile east of the railroad tracks, and a little south of east from the section post marking south end of section 8 and north end of section 7, about midway between mileposts 55 and 56. In 1931 reached via Yturria ranch, entering gate opposite Yturria station, and following main ranch trail 4.0 miles northeast to gate which leads to Yturria ranch. Do not pass through gate, but turn left on trail and go west about 1.45 miles, to where a group of ranch buildings show to right one-fourth mile, and there is an indistinct trail leading in a southerly direction. Turn left on this trail and follow it to south and southwest 0.7 mile to station, which is on a low flat knoll about one-fourth mile across, and clear of trees. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark no. 1 is standard reference disk in concrete, note 11 (b), 24.44 meters (80.2 feet) from the station in azimuth 352°53'. It is at the same elevation as station. In 1931 marks recovered in good condition. A new reference mark no. 2 was established near edge of clearing 310

paces from station in azimuth $46^{\circ}59'58''$. Elevation of station, 10.9 meters (36 feet).

Tarida (Kenedy County, F. L. Gallen, 1931; 1934).—About 16 miles southeast of Norias ranch, 11 miles north of Sauz ranch in King pastures, about 2 miles south of the deserted Tarida ranch. Reached from Raymondville by the concrete road due east 10.0 miles to point where it turns south, thence straight ahead on dirt road about 4 miles to Sauz ranch on north side of road, thence north on sandy ranch road and cross country trail for about 12 miles to station, which is about 0.4 mile southeast of a high sand hill, 200 yards west of a line of high sand dunes, and 65 feet west of trail. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). Both reference marks project about 2 inches above surface of ground. No. 1 is approximately 200 yards west of sand dunes, 25 feet west of sand trail, and 238.89 feet from station, in azimuth $186^{\circ}24'$. No. 2 is approximately 150 yards south of line of sand dunes, and 439.8 feet from station, in azimuth $311^{\circ}47'07''$. *B. M. traverse station no. 9 (U.S.G.S.)* is 19.120 meters (62.73 feet) from station in azimuth $304^{\circ}34'$.

Ladiana (Willacy County, F. L. Gallen, 1931).—About 14 miles east of Raymondville, and 4 miles north of Sauz ranch, on site of old Ladiana ranch. Reached from Raymondville by concrete road east 10.0 miles, thence ahead, east, 2 miles to turn in main road to north, thence north 0.7 mile to new cattle guard and road leading east over cattle guard to Sauz ranch. Turn east on this road 1.4 miles to Sauz ranch on north side of road; take road leading northeast at school building one-fourth mile to gate, go through gate and follow east side of fence north 1.6 miles to U.S.G.S.B.M. and a trail leading through a gate to the west. Follow this trail 0.3 mile to north-and-south road; turn right and follow this road north 1 mile to old Ladiana ranch building. Roads are bad in very wet or in very dry weather. Station is about 40 yards north of westernmost adobe shack, 10 meters (33 feet) southwest of gate through east-and-west fence, about 8 meters (26 feet) south of fence, and on a small ridge 4 to 5 feet high which parallels the fence. There is a large clearing on the north side of the fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is about 150 feet east of where trail bends sharply to northwest toward gate, about 150 feet southeast of easternmost adobe shack, about 20 feet east of footpath which leads southeast from bend in trail, in edge of mesquite, and 506.5 feet from station, in azimuth $308^{\circ}44'30''$. No. 2 is about 100 feet southwest of gate, 30 feet south of fence, 120 feet northwest of westernmost adobe shack, on the same ridge as the station, and 89.50 feet from it in azimuth $84^{\circ}05'$. Marks extend 3 to 5 inches above surface of ground.

Portalis 2 (Kenedy County, E. H. Pagenhart, 1913; 1934).—About 22 miles southeast of Norias and 14 miles northeast of Sauz, in the Calandre pasture of the Sauz ranch, and on the west shore of the Laguna Madre. In 1930 station was reached from Norias by the San Jose road (sand trail) southeast about 14 miles to gate entering San Luis ranch, just past a windmill on the left. Turn left (north) and go as follows: Keep to left-hand main road at 3.8 miles; pass Wajalote well on right at 6.7 miles; artesian well and tank on left at 9.1 miles; Rodeo Viego corral 300 yards to east at 9.4 miles. From the corral there is no definite road, but follow trail southeast along face of sand dunes past another concrete tank and bear to right around end of dunes to a windmill with elevated tank (Nido well), thence southeast on plain trail about 2 miles to another windmill at the Mujeres well. From this well follow a track southeast about 1 mile and bear right to a gate in strong wire fence. Gate is locked, key at Norias. Enter pasture through this gate and continue across country, picking up stretches of tracks at intervals about 2 miles to shore, thence along shore or a short distance inland south 3 miles to station. There is a fairly well marked track leading west to the Calandre tank (Old Portalis ranch) 1.6 miles north of the station. Station is on ridge about 10 feet above water on the first point along the shore south of the Sauz fence which has a growth of Spanish dagger or maguey. There is a similar point about one-half mile south of the station and south of the lagoon, which is also south of the station and separated from the Laguna Madre by a narrow sand bar at low water. Station is about 20 feet northwest of the highest point on east end of the hill, and 50 yards northeast of a large cluster of maguey plants. The Laguna Madre in 1930 was about 75 yards east of the station. Surface mark is standard disk station mark in cement post, note 17. Underground mark is nail or wood plug in cement, note 27. Reference mark is standard reference disk in cement

post, note 39, 64.70 feet from the station, in azimuth $65^{\circ}44'$. Other azimuths are: Left one of twin windmills, $58^{\circ}12'$; right one of twin windmills, $58^{\circ}24'$; windmill at Portalis ranch (about 3 miles) $99^{\circ}00'$. In 1932 it was reported that prominent clump of Spanish daggers referred to is gone. In 1934 station and reference marks recovered in good condition, but possibly will not withstand another storm. Station is about 2 feet from east shore bank.

Sauz (Willacy County, E. H. Pagenhart, 1913; 1934).—About 11 miles north-east of Sauz ranch and 1 mile south of Redfish Landing, in the Sauz pasture of the King ranch, on the west shore of the Laguna Madre, on a high ridge about $1\frac{1}{2}$ miles south of Sauz fish house. Station is about 50 yards north of south end of hard sand ridge which parallels the shore, 12 feet inland from 8-foot bluff, and directly east of water-filled lagoon. Wagon trail passes between station and bluff. Station mark is standard disk station mark set in concrete, note 17, except that top of post is even with surface of ground. Underground mark is nail or plug in cement, note 27. Reference mark is standard reference disk in cement post, note 39, its top 3 inches above the ground, and disk stamped dimly "11, 1920, L." Reference mark is on side of hill to westward, is about 6 feet lower than station, and is 15.08 meters (49.5 feet) from station, in azimuth $106^{\circ}38'$. In 1931 station and reference marks stamped "Sauz 1913-1931." Other azimuths from station are as follows: Left tangent of lagoon to westward 54° ; middle gap of same lagoon 72° ; windmill, 127° . Station was reached in 1930 from Raymondville by concrete and dirt road east 13.4 miles to Sauz ranch, thence east and northeast on public road 11.5 miles to fork three-fourth mile west of houses at the landing, which are visible. Take right-hand road which lead 0.8 mile to shore, then turn south and follow shore to station. Several cayas are crossed in doing this, and at some stages of the tide it may be impossible to cross them. In 1932 Sauz fish house reported gone. In 1934 reported station destroyed. Reference mark recovered in good condition, but probably will not withstand another storm. Mark is 1 foot from east bank, about 4 feet above water level, and 60 feet from water line.

Brenner (Willacy County, C. V. Hodgson, 1913).—About 5 miles west of Raymondville, one-fourth mile west of the former Cameron-Hidalgo County line, and 75 meters (246 feet) north of center of wagon road leading west from Raymondville, near the center of a small cleared but uncultivated field belonging to J. P. Brenner, of Raymondville. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11b, set in the line of the telephone poles along the road, at the same elevation as the station, and 70.75 meters (232.1 feet) therefrom in azimuth $346^{\circ}11'$. Elevation of station, 11.6 meters (38 feet).

Raymond (Willacy County, C. V. Hodgson, 1913).—About $2\frac{1}{2}$ miles east of Raymondville, three-fourths mile east of the crossroad at the northwest corner of the Raymond farm, one-fourth mile east of a small lake at the side of the road, and on south side of concrete highway, on land of Mr. Raymond, who has a pretentious house set back from road southeast of station. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set in the fence line on the south side of the road, at the same elevation as the station, and 32.26 meters (105.8 feet) therefrom in azimuth $340^{\circ}42'$. In 1930 the surface mark was reported destroyed when field was cleared in 1929. Reference mark not found, its location being in concrete pavement. Underground mark not found, but may still be in place. Elevation of station, 9.8 meters (32 feet).

Hidalgo (Hidalgo County, C. V. Hodgson, 1913).—About $4\frac{1}{2}$ miles west and one-fourth mile south from Sebastian, three-eighths mile west of north from the Asadon ranch owned by Sr. Cavazos and in azimuth 169° from the ranch windmill, about 75 meters (246 feet) west of the Cameron-Hidalgo County line, and about 5 meters (16 feet) west of a wagon road which runs north and south near the county line. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set at the west side of the wagon road, at the same elevation as the station, and 29.40 meters (96.5 feet) therefrom in azimuth $180^{\circ}10'$. Elevation of station, 16.0 meters (52 feet).

Sebastian (near Willacy-Cameron County line, C. V. Hodgson, 1913).—About $1\frac{1}{2}$ miles east and one-half mile south from Sebastian and 70 meters (230 feet) south of a line fence with an unfenced wagon road along its south side, on a slight rounded elevation in a pasture covered with mesquite brush. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a).

Reference mark is standard reference disk in concrete, note 11b, set in the line of the fence mentioned above, at the same elevation as the station, and 73.40 meters (240.8 feet) therefrom in azimuth $211^{\circ}19'$. Elevation of station, 16.0 meters (52 feet).

Mercedes (Hidalgo County, C. V. Hodgson, 1913).—About $3\frac{1}{2}$ miles east and $3\frac{3}{4}$ miles north of Mercedes, one-half mile west of the Cameron-Hidalgo County line on land belonging to a Mr. Woltz, of Missouri, and at present rented by T. E. Blacklock, about 68 meters (223 feet) from the northeast corner of Mr. Blacklock's house, in the fence line on the east side of a lane leading north and about 10 meters (33 feet) north of the turn in an irrigation ditch. *Heidelberg church steeple* is about 1 mile distant in azimuth $56^{\circ}44'54''$. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set in the fence line on the east side of the lane mentioned above, at the same elevation as the station, and 40.622 meters (133.28 feet) therefrom in azimuth $178^{\circ}49'$. Elevation of station, 19.9 meters (65 feet).

Harlingen (Cameron County, C. V. Hodgson, 1913).—About 3 miles west of Harlingen and 35 meters (115 feet) north of the center of the Harlingen-Mercedes wagon road, on land now covered by mesquite brush. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set in the fence line on the north side of the road, at the same elevation as the station, and 27.448 meters (90.05 feet) therefrom in azimuth $2^{\circ}04'$. Elevation of station, 17.2 meters (56 feet).

Maria (Hidalgo County, C. V. Hodgson, 1913).—About $1\frac{1}{2}$ miles northwest of Santa Maria and 22 meters (72 feet) east of the old military wagon road, in the yard in front of the house occupied by F. N. Johnson and 5 meters (16 feet) south of the road leading to his house. Mr. Johnson's windmill is about 62 meters (203 feet) distant in azimuth $230^{\circ}21'$, a small Mexican cemetery surrounded by bushes is about 160 meters (525 feet) distant in azimuth 291° , and the north steeple of the Christian Church at Santa Maria is in azimuth $290^{\circ}40'$. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). The reference mark, *United States and Mexico Boundary Monument R.P. no. 31* of the International Boundary Commission Survey is 41.120 meters (134.91 feet) from the station in azimuth $212^{\circ}54'26''$. Elevation of station, 23.2 meters (76 feet).

Mitla (Cameron County, C. V. Hodgson, 1913).—About 6 miles east of Santa Maria and 95 meters (312 feet) from the southwest corner of the railroad station at Mitla in azimuth 79° and about 16 meters (52 feet) south of center of railroad track. There is only a station at Mitla; no houses are near. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set on north side of the railroad track, at same elevation as the station, and 42.998 meters (141.07 feet) therefrom in azimuth $181^{\circ}52'$. Elevation of station, 18.7 meters (61 feet).

Donna (Hidalgo County, C. V. Hodgson, 1913; 1917).—About one-half mile southeast of Donna, on the west side of a large irrigation canal, on land owned by Dr. Roberts of Donna, and 25 meters (82 feet) northwest of Mexican jacal. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at same elevation as the station and 31.58 meters (103.6 feet) therefrom in azimuth $8^{\circ}07'$. *Donna longitude station* (see description thereof) is 0.17 meter (0.6 foot) due north and 31.607 meters (103.70 feet) due west of station. Elevation of station, 29.9 meters (98 feet).

Rio (Hidalgo County, C. V. Hodgson, 1913; 1917).—About 40 meters (131 feet) south of the old military road in an open space directly in front of Progreso village. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), set in the fence line, 1 meter (3 feet) east of the gate on the road leading from the main road to Progreso post office and church, at the same elevation as the station, and 42.61 meters (139.8 feet) therefrom in azimuth $354^{\circ}08'$. Azimuth from station to *Progreso church steeple* about one-fourth mile distant is $358^{\circ}25'01''$. In 1917, "Rio 1913" was stenciled on the metal station and reference marks. Elevation of station, 24.2 meters (79 feet).

Tenacitas (State of Tamaulipas, Mexico, 1911; 1916).—Following description furnished by La Comisión Geodésica Mexicana: At the extreme eastern end of

the base Colombres-Tenacitas, about one-half kilometer (one-third mile) to the west of the railroad station Tenacitas, and about 10 meters (33 feet) to the south of the road. The station is marked by a cross on the top of a piece of iron about 1 meter (3.3 feet) in height. The station has an elevation above sea level of about 24 meters (79 feet).

Colombres (State of Tamaulipas, Mexico, 1911; 1916).—Following description furnished by La Comisión Geodésica Mexicana: At the extreme western end of the base measured along the side of a tangent of a railroad running from Monterey to Matamoras, about 100 meters (328 feet) to the west of the railroad station of the same name, and $9\frac{1}{2}$ meters (31 feet) to the south of the road. The station is marked by a cross on the top of a piece of iron about 1 meter (3.3 feet) in height. The station has an elevation of about 30 meters (98 feet).

Supplementary points

T. 5 S. R. 7 W. sec. 25 center (Jefferson County, Okla., W. Bowie, 1902; 1923).—About 5 miles east and 1 mile north of Sugden, near highest point of ridge running north and south on land belonging (in 1923) to W. A. Paddock. Marked by stone post. Station *Benton* (see description thereof) is 123.93 meters (406.6 feet) distant in azimuth $102^{\circ}07'46''$. In the original records this point was incorrectly described as T. 5 S., R. 7 W., sec. 24, southwest corner.

Jim Ned (U.S.G.S.) (Montague County, W. Bowie, 1902).—About 8 miles southwest of St. Jo, 8 miles southeast of Montague, and 1 mile south of Dy Mound post office, at highest point of bare, flat hill known as "Jim Ned Lookout", one-eighth mile east of Dy Mound-Bowie road, and one-half mile northeast of house of D. R. Raymond and on his land. Marked by bronze tablet in sandstone post, 30 by 10 by 8 inches, set 28 inches in ground. *Bowie standpipe* (U.S.G.S.) is about 13 miles from station in azimuth $75^{\circ}49'03''$.

Bowie northwest base latitude station (Clay County, W. H. Burger, 1906).—Distant 1.708 meters (5.60 feet) south and 1.299 meters (4.26 feet) east from station *Bowie northwest base* (see description thereof). Marked by a pier, probably of wood.

Waters Mountain (U.S.G.S.) (Lampasas County, O. W. Ferguson, 1902).—About 10 miles north of west from Lampasas, about $2\frac{1}{2}$ miles south of east from Nix post office, on lone hill covered with dense growth of brush, about one-half mile south of Lampasas-Nix wagon road, about one-half mile from tenth mile post from Lampasas, and 9.4 feet N. $22^{\circ}43'$ E. from U.S.G.S. signal tree. Marked by stone 20 inches in diameter embedded in ground bearing cross and marked "U.S.G.S." Mountain also known locally as Green Mountain. Elevation of station, 487 meters (1,598 feet).

Bachelor latitude station (Burnet County, W. H. Burger, 1906).—Distant 40.99 meters (134.5 feet) due west of station *Bachelor* (see description thereof). Marked by wooden pier.

Shovel Mountain (U.S.G.S.) (Blanco County, W. H. Burger, 1903).—Station is 5.914 meters (19.40 feet) in azimuth $269^{\circ}26'$ from station *Shovel* (see description thereof). Marked by large cairn of loose rock about 10 feet high and $4\frac{1}{2}$ feet in diameter. Smaller cairn placed also by United States Geological Survey is on east edge of mountain about three-eighths mile distant.

Shingle Hill (U.S.G.S.) (near Travis and Hays County line, W. H. Burger, 1903).—Station is 5.548 meters (18.20 feet) in azimuth $146^{\circ}49'$ from station *Shingle* (see description thereof). Marked by cross and letters "U.S.G.S." cut on large flat rock.

Austin latitude station (Travis County, W. Eimbeck, 1872).—Near northeast corner of public reservation, bounded on north by College Avenue, on west by Brazos Street, on south by Mulberry Street, and on east by alley, and occupied in 1872 by General Land Office of State of Texas. Marked by pier of cut-stone masonry 16 inches by 22 inches, with rubble masonry base extending 30 inches below surface of ground and resting on solid layer of gravel. *Austin north meridian* (see description thereof) is 369.6 feet due north of station. In 1895 reported that pier had been pulled down to within a few inches of the ground; also that station was practically in New Brazos Street. In 1899 it was reported that station had been damaged and probably shifted by construction work on street.

Austin north meridian (Travis County, W. Eimbeck, 1872; 1932).—In eastern part of State capitol grounds, hidden in thick hedge of privet or boxwood between *Austin longitude station* (1911) (see description thereof) and iron fence along Brazos Street. Marked by copper bolt in center of top of massive monument

built of limestone and capped with very heavy slab. *Austin latitude station* (see description thereof) is 369.6 feet due south of station. *Austin longitude station* (1895) (see description thereof) is 14.5 feet due north. *Austin longitude station* (1911) (see description thereof) is 4.303 meters (14.12 feet) north and 11.707 meters (38.41 feet) west of station.

Austin longitude station (1895) (Travis County, E. Smith, 1895; 1911).—In eastern part of State capitol grounds. In 1911 reported between two young trees, in middle of flower bed surrounded by low hedge. Marked by pier of brick and cement. *Austin latitude station* (see description thereof) is 384.1 feet due south. *Austin north meridian* (see description thereof) is 14.5 feet due south. *Austin longitude station* (1911) (see description thereof) is 11.716 meters (38.44 feet) west and 0.122 meter (0.40 foot) south of station. In 1932 reported apparently destroyed.

Austin longitude station (1911) (Travis County, E. Smith, 1911; 1932).—In eastern part of State capitol grounds. Marked by triangulation station disk stamped with words "Astronomical Station" in top of concrete pier 14 by 26 inches projecting 34 inches above ground, with base 18 inches by 30 inches extending 2 feet into ground. *Austin longitude station* (1895) (see description thereof) is 11.716 meters (38.44 feet) east and 0.122 meter (0.40 foot) north of station. *Austin north meridian* (see description thereof) is 11.707 meters (38.41 feet) east and 4.303 meters (14.12 feet), south of station. *Austin, capital dome, star in hand of Liberty*, is 401.65 feet west and 184.35 feet north of station.

Cedar Hill (U.S.G.S.) (Hays County, O. W. Ferguson, 1903).—Station is 8.517 meters (27.94 feet) in azimuth 289°08' from station *Cedar* (see description thereof). Marked by rough flat stone about 1 foot square, top 2 inches below average surface of ground and marked with cross and letters "U.S.G.S."

Mission latitude station (Comal County, W. H. Burger, 1906).—Distant 5.10 meters (16.7 feet) due east of station *Mission* (see description thereof). Marked by a wooden pier.

Herndon Hill (U.S.G.S.) (Guadalupe County, W. H. Burger, 1903; 1924).—U.S. Geological Survey bench mark (705/3) consisting of iron pipe with screw top tablet, projecting 2 feet above ground, 4.309 meters (14.14 feet) in azimuth 309°30' from station *Herndon* (see description thereof), and 2 feet west of lone, small oak tree which is nearly dead.

Karnes latitude station (Karnes County, W. H. Burger, 1906).—Distant 4.84 meters (15.9 feet) due east of station *Karnes* (see description thereof). Marked by a wooden pier.

Miller latitude station (Bee county, W. H. Burger, 1905).—Very nearly in the center of a north-and-south lane and 4.50 meters (14.8 feet) due west of station *Miller* (see description thereof). Marking not recorded.

Alice longitude station (Nueces County, E. Smith, 1906).—Distant 0.814 meter (2.67 feet) due north from station *Alice* (see description thereof). Marked by a concrete pier 16 by 26 inches in cross section, 2½ feet in the ground, and 2¾ feet above the ground.

Alice latitude station (Nueces County, W. H. Burger, 1905).—Distant 9.03 meters (29.6 feet) due east of station *Alice* (see description thereof). Marked by a wooden pier.

Kleberg (Kleberg County, C. V. Hodgson, 1913).—About 7 miles south and 4 miles east from Kingsville, 2½ miles east and 1 mile south from Ricardo, on land owned by Kleberg Land & Improvement Co., near east side center of block 57 on small ridge covered by mesquite trees and about 75 meters (246 feet) west of wagon road. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), at same elevation as station, and 20.070 meters (65.85 feet) from it in azimuth 190°04'. Elevation of station, 19.7 meters (65 feet).

Donna longitude station (Hidalgo County, C. V. Hodgson, 1913; 1916).—About one-half mile southeast of Donna, on west side of large irrigation canal, on land owned by Dr. Roberts, of Donna. Original mark was tack in center of concrete pier. In 1916 pier had been broken off but base is still in place. Station is 0.17 meter (0.6 foot) due north and 31.607 meters (103.70 feet) due west of station *Donna* (see description thereof).

United States and Mexico boundary monument, R. P. no. 31 (near United States and Mexico boundary, C. V. Hodgson, 1913).—A reference monument of the International Boundary Commission, consisting of concrete truncated pyramid 2½ feet high with bases of 12 and 18 inches, on concrete base 2 feet square and 2 feet deep. Word "Banco" and number thereof stamped in concrete. Iron

plate on top of monument is marked with cross and letters "I B C" and "C de L." Station is 41.120 meters (134.91 feet) in azimuth $212^{\circ}54'$ from station *Maria* (see description thereof). Elevation of station, 24 meters (79 feet).

United States and Mexico boundary monument, R. P. no. 28 (near United States and Mexico boundary, C. V. Hodgson, 1913).—A reference monument of the International Boundary Commission, consisting of concrete truncated pyramid $2\frac{1}{2}$ feet high with bases of 12 and 18 inches, on concrete base 2 feet square and 2 feet deep. Word "Banco" and number thereof stamped in concrete. Iron plate on top of monument marked with cross and letters "I B C" and "C de L." Station is 358.920 meters (1,177.56 feet) in azimuth $352^{\circ}55'30''$ from station *Rio* (see description thereof). Elevation of station, 25 meters (82 feet).

NINETY-EIGHTH MERIDIAN TO POINT ISABEL ARC

Principal points

Benito (Cameron County, C. V. Hodgson, 1913).—About 4 miles south of San Benito and about 1 mile southeast of residence of Mr. Thomas, on land belonging to the San Pedro de Carrecitos estate and probably on portion no. 8. To reach from Mr. Thomas' residence, take road running east one-fourth mile to where it crosses a large resaca, then take faint road to the south along the east bank of the resaca for about three-fourths mile, where the resaca makes a large horseshoe loop to the west for about one-half mile. The distance across the loop at the base of the horseshoe is only about 275 meters (902 feet) and the station is about midway of the distance and about 45 meters (148 feet) east of the faint wagon road which crosses the base of the loop and continues down the east side of the resaca. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), on the east side of the faint wagon road, at the same elevation as the station, and 42.730 meters (140.19 feet) therefrom in azimuth $10^{\circ}16'$. Following distances and azimuths are from station: *San Benito standpipe*, about 4 miles, $173^{\circ}59'22''$; Mr. Thomas' residence, about 1 mile, $106^{\circ}31'$. Elevation of station, 15.42 meters (50.6 feet).

Cowgill (Cameron County, C. V. Hodgson, 1913; 1932).—About 4 miles northeast from San Benito and 1 mile northeast of the residence of Mr. Cowgill, on a graded road leading southeast from Sam Houston Boulevard (concrete), on a low ridge between two old resacas. In 1932 further described as being almost in the line of the telephone poles on the southeast side of the boulevard, and about 400 feet southwest of the Monte Meta Burial Park Building. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). In 1932 it was reported that the surface mark is partly gone, a part of it being under the road surface. Reference mark, a standard reference disk in concrete, note 11 (b), set on the northwest side of the concrete boulevard, was reported in 1932 as being at the edge of a borrow pit, in danger of being destroyed. It is at the same elevation as the station, and 18.095 meters (59.37 feet) therefrom in azimuth $133^{\circ}50'$. Elevation of station, 9.97 meters (32.7 feet).

Olmito (Cameron County, C. V. Hodgson, 1913).—About 2 miles north from Olmito on the west side of the road leading north from the railroad station and about 100 meters (328 feet) south of the county drain ditch, on land belonging to Mr. Gay, of Olmito. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), on the opposite side of the road, at the same elevation as the station, and 24.599 meters (80.70 feet) therefrom in azimuth $258^{\circ}45'$. Elevation of station, 8.98 meters (29.5 feet).

Resaca (Cameron County, C. V. Hodgson, 1913).—About 3 miles north of the new road between San Benito and Point Isabel, 2 miles northwest of Los Soldados ranch, on the south bank of the southernmost and smaller of two large resacas and about 75 paces west of a Mexican shack. Surface and underground marks are standard disk station marks in concrete, notes 1 (b) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (b), just east of where a fence line runs west from a north-and-south fence with a wagon road on its east side, at the same elevation as the station, and 32.11 meters (105.3 feet) therefrom in azimuth $92^{\circ}57'$. Elevation of station, 7.18 meters (23.6 feet).

Arista (Cameron County, R. E. Halter, 1885; 1913).—About halfway between Point Isabel and Brownsville, and 650 meters (2,133 feet) from the railway, on the highest part of a hill. The station is marked as follows: The subsurface

For notes in regard to marking of stations see p. 154.

mark is a beer bottle 8 inches long filled with concrete and incased in a cylinder of concrete. The bottle is $2\frac{1}{2}$ feet below the surface of the ground. Over the subsurface mark was placed a layer of sand and earth 6 inches thick, and upon this was set the surface mark, consisting of a piece of terra-cotta sewer pipe 6 inches in diameter and 26 inches long, filled with concrete and incased in a cylinder of concrete 18 inches in diameter and 26 inches long; in the center of the top of the pipe was embedded a bottle. A nail has its point projecting one-fourth inch above the concrete. The top of the cylinder of concrete bears the letters U.S.C. & G.S. 1905, around the top. The reference mark is a piece of sewer pipe 6 inches in diameter and 26 inches long; the pipe is set in concrete and then filled with concrete, with a 12-penny nail set head down in the center of the top of the pipe, its point projecting one-fourth inch above the concrete. The reference mark is 11.330 meters (37.17 feet) S. $63^{\circ}30'$ E. from the station. In 1913 the top of the reference mark had been shattered and broken off. Elevation of station, 10.27 meters (33.7 feet).

Point Isabel west base (Cameron County, O. B. French, 1906; 1913).—About 2 miles west of a small ranch house and windmill, in the town of Laguna Vista, and about one-half mile south of the road between San Benito and Point Isabel. The station is marked as follows: The subsurface mark is a beer bottle 8 inches long filled with concrete and incased in a cylinder of concrete. The bottle is $2\frac{1}{2}$ feet below the surface of the ground. Over the subsurface mark was placed a layer of sand and earth 6 inches thick, and upon this was set the surface mark, consisting of a piece of terra-cotta sewer pipe 6 inches in diameter and 26 inches long, filled with concrete and incased in a cylinder of concrete 18 inches in diameter and 26 inches long; in the center of the top of the pipe was embedded a bottle. A nail has its point projecting one-fourth inch above the concrete. The top of the cylinder of concrete bears the letters U.S.C. & G.S. 1906, around the top. The reference mark is a piece of sewer pipe 6 inches in diameter and 26 inches long; the pipe is set in concrete and then filled with concrete with a 12-penny nail set head down in the center of the top of the pipe; its point projecting one-fourth inch above the concrete. The reference mark is 24.25 meters (79.6 feet) from the station in azimuth approximately 293° . Elevation of station, 3.00 meters (9.84 feet).

TEXAS-CALIFORNIA ARC

Principal points

Rattlesnake (Eastland County, W. Bowie, 1908).—On Rattlesnake Mountain, 15 miles south of Strawn, a town on the Texas & Pacific Railway, 2 miles southwest of Tanner post office, 300 meters (984 feet) west of the Granbury and Eastland City road, in the W. T. Marshall pasture, and on the southern and higher one of two peaks known as "Little Rattlesnake" and "Big Rattlesnake" Mountains. The top of the peak is bare. Surface mark is a large nail in iron pipe set in concrete, note 21 (a), flush with surface of ground; underground mark is similar to surface mark, and is described in note 32 (a). The reference mark, a 20-penny wire nail cemented into a ledge of rock, is 22.25 meters (73.0 feet) from the station in azimuth $186^{\circ}16'$. Elevation of station, 493.2 meters (1,618 feet).

Lacasa (Stephens County, W. Bowie, 1908; 1912).—Thirteen miles due north of Ranger, a town on the Texas & Pacific Railway, 3 miles north of Lacasa post office and 1 mile west of the Ranger-Caddo road, on top of the highest peak of a very prominent ridge. The peak is somewhat rounded and is partly covered with low trees. The station is on the property of Robert Milholland and 6.80 meters (22.3 feet) south of the fence between his property and that of Matt Stevenson. The center of Milholland's house is about 200 meters (656 feet) from the station in azimuth $348^{\circ}38'$. Surface mark is a large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to the surface mark, and is described in note 32 (a). Reference mark is of the same general type as station marks, is described in note 42 (a) and is 29.56 meters (97.0 feet) from the station in azimuth $97^{\circ}10'$. Azimuth from station of church, west gable, distant 2 miles, is $331^{\circ}26'17''$. Elevation of station, 487.4 meters (1,599 feet).

Pierce (Stephens County, W. Bowie, 1908).—About 5 miles by road, or $3\frac{1}{2}$ miles direct, northwest of Ranger, a town on the Texas & Pacific Railway, about 375 meters (1,230 feet) west of the center of the Ranger-Wayland public road, and about one-fifth mile north of the boundary between Stephens and Eastland Counties, on the property of David Z. Pierce. The station is in a wood lot 16.94

meters (55.6 feet) north of an east-and-west fence which separates the wood lot from a cultivated field, and 25 paces northeast of a tenant house. Surface mark is a large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), is in the east-and-west fence mentioned above, and is 16.94 meters (55.6 feet) from the station in azimuth $347^{\circ}06'$. Other distances and azimuths are as follows: South gable of Pierce's house, 221.60 meters (727.0 feet), $244^{\circ}49'$; chimney on Pierce's house, 225 meters (738 feet), $241^{\circ}50'$. Elevation of station, 489.5 meters (1,606 feet).

Hearn (Eastland County, W. Bowie, 1908).—Ten miles south and 4 miles east of Cisco, a town on the Texas & Pacific Railway, 1 mile south and $4\frac{1}{2}$ miles west of Carbon, a town on the Texas Central Railroad, at the highest point of the Carbon-Romney public road, and about 1 mile east of where this road joins the Cisco-Long Branch public road. The station is 4.74 meters (15.6 feet) south of fence on the south side of the road, on land covered with low trees and belonging to J. M. Hearn, about 100 meters (328 feet) west of the northeast corner of his property and about five-eighths of a mile northeast of his house. Surface mark is a large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is also of same general type as station marks, is described in note 42 (a) and is in the fence line on the south side of the road, 27.17 meters (89.1 feet), from the station in azimuth $99^{\circ}17'$. Elevation of station, 499.7 meters (1,639 feet).

Flat (Eastland County, W. Bowie, 1908).—About $8\frac{1}{2}$ miles by road northwest of Eastland, $12\frac{1}{2}$ miles by road northeast of Cisco, towns on the Texas & Pacific Railway, and one-half mile west of the Cisco-Gunsight public road, on the highest point and near the north end of a short wooded ridge running north and south called, on the United States Geological Survey map, "Flat Top Mountain", a name not recognized locally. The station is 43.40 meters (142.4 feet) west of a north-and-south fence running along the eastern edge of the top of the peak, on land belonging to P. Thorp, of Gunsight. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), is in the fence mentioned above, and is 47.53 meters (155.9 feet) from the station in azimuth $297^{\circ}59'$. Other distances and azimuths are as follows: Chimney of a white house, about three-fourths of a mile, $231^{\circ}22'$; chimney of N. J. Ramsower's house, about three-fourths of a mile, $298^{\circ}31'$. Elevation of station, 496.8 meters (1,630 feet).

Springgap (Callahan County, W. Bowie, 1908).—Twelve miles by road southwest of Putnam, 12 miles by road southeast of Baird, towns on the Texas and Pacific Railway, and one-half mile south of the Baird-Brownwood public road, near the northwest corner of the Springgap Mountains. It is on a peak having a flat top partly covered with scrub brush, and is 475 paces S. 80° E. from the extreme northwest corner of the top of the mountain, 44 meters (144 feet) south of north edge of top of mountain, on property belonging to Richard Cordwell, of Admiral. Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is a spike set in a drill hole, as described in note 8 (d). Reference mark no. 1, a cross with drill hole at its center and marked with the letters U. S. C. & G. S. cut into a ledge of the rock at the edge of a bluff, is 44.022 meters (144.43 feet) from the station in azimuth $204^{\circ}35'$. Reference mark no. 2, a pipe set in concrete, is 12.705 meters (41.68 feet) from the station in azimuth $214^{\circ}45'$. From the station the south gable of the Admiral Church is distant about 2 miles, in azimuth $172^{\circ}35'$, and the south gable of J. H. Brown's house is distant about one-half mile in azimuth $198^{\circ}50'$. Elevation of station, 664.3 meters (2,179 feet).

Hitson (U.S.G.S.) (Callahan County, W. Bowie, 1908).—This station is identical with the United States Geological Survey station of the same name. It is on the higher and more southern one of the two highest peaks of the Hitson Mountains, on the property of R. D. Williams, of Putnam, about 12 miles by road northwest of Putnam and 9 miles by road northeast of Baird, towns on the Texas & Pacific Railway. It is 30 paces west of the east break of the top of the peak, 35 paces east of the west break, and 100 paces south of the north break. Surface mark is large iron nail in iron pipe set in concrete, note 21 (b); underground mark is spike set in drill hole, as described in note 8 (d). The reference mark, a cross with a drill hole at its center, cut into the solid outcropping rock, is 19.160 meters (62.86 feet) from the station in azimuth $235^{\circ}54'$. Elevation of station, 572.3 meters (1,878 feet).

Lamb (Eastland County, W. Bowie, 1908).—Two miles south and 5 miles west of Cisco, 2 miles south, and 2 miles east of Dothan, towns on the Texas & Pacific Railway, and 1 mile south of the old Base Line public road, on one of the highest points of an extensive plateau. It is on the property of J. J. Livingston and in a grove of low oak trees just to the east of a north-and-south road. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), and is 0.40 meter (1.3 feet) east of the fence line on the east side of the road, and 21.09 meters (69.2 feet) from the station in azimuth $105^{\circ}24'$. Other distances and azimuths are as follows: South gable of J. F. Lamb's house, about 120 meters (394 feet), $158^{\circ}12'$; east chimney of Livingston's house, 78.10 meters (256.2 feet), $356^{\circ}28'$. In 1933 station and reference marks reported destroyed. Elevation of station, 534.80 meters (1,754.6 feet).

Kennard (Callahan County, W. Bowie, 1908).—Eleven miles by road northwest of Baird, about 16 miles by road northeast of Abilene, and $7\frac{1}{2}$ miles north of Clyde, towns on the Texas & Pacific Railway, in a cultivated field belonging to John Kennard, whose address is Clyde, and near the northwest corner of a long north-and-south ridge which has a nearly flat top with a few scattered trees growing on it. A peach orchard is just south of the station. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), and is in an east-and-west fence separating pasture from cultivated field, 234.13 meters (768.1 feet) from the station in azimuth $172^{\circ}25'$. Other distances and azimuths are as follows: North gable of Kennard's house, 144.92 meters (475.5 feet), $345^{\circ}40'$; northwest corner of Kennard's barn, about 150 meters (492 feet), $311^{\circ}52'$. Elevation of station, 619.3 meters (2,032 feet).

Clayton (Taylor County, W. Bowie, 1908).—This station is very close to site of the United States Geological Survey station "Lidel", which was not recovered. It is about 13 miles by road southeast of Abilene, a town on the Texas & Pacific Railway, about 3 miles south-southwest of the post office and village of Potosi, and about $\frac{1}{2}$ mile east of the East Abilene-Coleman public road at a point where it crosses a mountain. It is on a clear peak, the highest peak of a very prominent ridge, and in the pasture of Mr. McDonald. Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is an old type station mark set in bedrock, note 8 (aa), except that only 4 inches of earth separates the two marks. Reference mark is of same general type as station marks, is described in note 42 (a) except that the pipe projects about 5 inches above the ground and is 14.280 meters (46.85 feet), from the station in azimuth $151^{\circ}19'$. Azimuth from station of Abilene, courthouse dome, is $167^{\circ}15'59''$; Potosi, church spire, $194^{\circ}47'04''$. Elevation of station, 710.0 meters (2,329 feet).

Clyde (Callahan County, W. Bowie, 1908).—Four and one-half miles by road northwest of Baird, $2\frac{1}{2}$ miles by road northeast of Clyde, towns on the Texas & Pacific Railway, and 600 meters (1,969 feet) south of the upper or north Baird-Clyde public road, on the highest point of the more southern 1 of 2 prominent hills which are about one-half mile apart. The hill is rather sandy and covered with oak bushes, and the land is owned by Joseph Weldy, of Clyde. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is also of same general type as station marks, is described in note 42 (a) and is 3.517 meters (11.54 feet) from the station in azimuth $314^{\circ}13'$. The northeast corner of a house is about 50 paces from the station in azimuth $142^{\circ}13'$. Elevation of station, 633.8 meters (2,079 feet).

Morrison (Taylor County, W. Bowie, 1908).—About 9 miles by road northwest by west from Abilene and 2 miles east and 4 miles north of Tye, towns on the Texas & Pacific Railway. It is in the Morrison pasture on the highest point of the highest hill in the vicinity, which has a flat top, almost level, with its edges cut by ravines. The station is near the extreme western edge of the top of the hill about 300 meters (984 feet) south-southwest from a water tank and near the head of a deep ravine running southwest. Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is an iron spike in drill hole, note 8 (d). Reference mark is iron spike in iron pipe set in concrete, note 42 (b), and is 14.620 meters (47.97 feet) from the station in azimuth $159^{\circ}44'$. Abilene standpipe (U.S.G.S.) (see description thereof) is distant 7.4 miles in azimuth $304^{\circ}46'57''$. Elevation of station, 561.2 meters (1,841 feet).

Buzzard (Taylor County, W. Bowie, 1908).—Six miles south and 3 miles east of Merkel, a town on the Texas & Pacific Railway, on Buzzard Peak, which is the northeast spur or corner of an extensive flat-topped ridge, and about 1 mile east-southeast of East Peak, shown on the United States Geological Survey map. The station is where the Buzzard Peak spur joins the main ridge on land belonging to either Fred Dubo or J. T. Humphreys, whose address is Merkel. The peak or spur is flat-topped and covered with scrub brush. Surface mark is nail in iron pipe set in concrete, note 21 (b); underground mark is old type station mark set in bedrock, note 8 (aa). Reference mark is large nail in iron pipe set in concrete, note 42 (a), the pipe projecting about 5 inches above the ground; it is 14.800 meters (48.56 feet) from the station in azimuth $293^{\circ}58'$. Other distances and azimuths are as follows: North corner of Buzzard Peak, about 400 meters (1,312 feet), $193^{\circ}50'$; east corner of Buzzard Peak, about 400 meters (1,312 feet), $286^{\circ}30'$. Round peak, about 2 miles, $108^{\circ}51'$. Elevation of station, 734.3 meters (2,409 feet).

Sears (Jones County, W. Bowie, 1908; 1912).—Nine miles by road, or 6 miles direct, north by west from Merkel, a town on the Texas & Pacific Railway, and 1 mile east of the Merkel-Neinda public road, on a prominent flat-topped hill in the pasture of John Sears, of Whitewright, Grayson County. The station is 3 miles south of the village of Noodle, which is on the main public road. It is in clear pasture land on the highest part of the more western 1 of the 2 most southern spurs of the hill, 115 meters (377 feet) west of a north-and-south ravine, about 60 paces northeast of the head of a ravine running southwest and about 300 meters (984 feet) northeast of the end of the spur. Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is old type station mark set in bedrock, note 8 (aa). Reference mark is large nail in iron pipe set in concrete, note 42 (a); it is 12.94 meters (42.5 feet) from the station in azimuth $262^{\circ}47'$. The east gable of a house in the southwest corner of the pasture, near the Merkel-Neinda road, is about $\frac{1}{4}$ of a mile from the station in azimuth $73^{\circ}45'$. Azimuth from station of *Merkel, tail water tank*, distant about 6 miles, is $344^{\circ}38'43''$. Elevation of station, 578.0 meters (1,896 feet).

Hale (Nolan County, W. Bowie, 1908).—Nine miles in direct line west-southwest from Merkel, and $4\frac{1}{2}$ miles direct southwest by south from Trent, towns on the Texas & Pacific Railway. It is 1 mile west of the house of T. C. Hale, three-fourths mile southeast of house of F. C. Hale, on highest point of mountain in this vicinity, and about 600 meters (1,969 feet) south of extreme north edge of top of hill, in pasture said to belong to Arthur Sears. Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is an old type station mark set in drill hole, note 8 (aa). Reference mark is large nail in iron pipe set in concrete, note 42 (a); it is 14.12 meters (46.3 feet) from station in azimuth $280^{\circ}35'$. Elevation of station, 773.3 meters (2,537 feet).

Boyd (Nolan County, W. Bowie, 1908).—About $5\frac{1}{2}$ miles in a direct line south from Eskota, a town on the Texas & Pacific Railway, and on a somewhat rounded knoll near the north edge of a very prominent ridge. The station is on solid rock, about 10 meters (33 feet) south-southeast of the highest point of this part of the ridge, and is in the Boyd pasture. In erecting the stand, holes 6 inches square and 6 inches deep were drilled in the solid rock to receive the lower ends of the legs, and when the stand decays these holes will serve as reference marks. The station is marked with an old-type station mark cemented into a drill hole in the solid rock, note 2 (a). The reference mark, a cross cut in a large solid rock with a 1-inch drill hole at the center, is 18.11 meters (59.4 feet), from the station in azimuth $217^{\circ}44'$. A small tree is 22.20 meters (72.8 feet) from the station in azimuth $277^{\circ}06'$. Azimuth from station of *Eskota water tank*, distant about 5 miles, is $172^{\circ}23'26''$. Elevation of station, 770.4 meters (2,528 feet).

Allen (Fisher County, W. Bowie, 1908).—Six miles direct, or $7\frac{1}{2}$ miles by road, northwest from Eskota, 10 miles direct, or 14 miles by road, northeast from Sweetwater, towns on the Texas & Pacific Railway and 200 meters (656 feet) west of the Eskota-Roby public road. It is on prairie land on the highest part of a prominent round-topped knoll. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, note 42 (a), and is 14.825 meters (48.64 feet) from the station in azimuth $0^{\circ}11'$. The chimney of N. H. Allen's house is about 300 meters (984 feet) from the station in azimuth $236^{\circ}42'$, and a cotton-gin stack is distant about 2 miles

in azimuth $91^{\circ}57'$. Azimuth from station of *Sweetwater, schoolhouse cupola*, distant about 9 miles, is $31^{\circ}36'01''$. Elevation of station, 673.5 meters (2,210 feet).

Patterson (Nolan County, J. S. Hill, 1909).—Four miles due north of Roscoe, a town on the Texas & Pacific Railway, on an extensive tableland on the farm of A. A. Patterson, who lives three-fourths of a mile north of the station. It is 9.83 meters (32.3 feet) north of the north edge of the main east-and-west road, 700 meters (2,297 feet) east of the southwest corner of Patterson's property and between two of his tenant houses. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), is 5.80 meters (19.0 feet) south of the fence on the south side of the road, and 23.684 meters (77.70 feet) from the station, in azimuth $359^{\circ}04'$. Other distances and azimuths are as follows: East gable of tenant house, about 300 meters (984 feet), $80^{\circ}17'$; Patterson's windmill, about 1 mile, $208^{\circ}31'$; southeast corner of other tenant house, 67.80 meters (222.4 feet), $241^{\circ}46'$; *Roscoe, schoolhouse cupola*, $356^{\circ}04'24''$. Elevation of station, 726.68 meters (2,384.1 feet).

Lloyd (Nolan County, J. S. Hill, 1909).—Nine miles by road, or $8\frac{1}{4}$ miles direct, south-southeast from Roscoe, a town on the Texas & Pacific Railway and three-fourths of a mile east of the Roscoe-Deckers public road. It is near the north end of a high flat-top ridge in a pasture owned by Charles Lloyd, whose house is about one-half mile west of the station. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), and is 13.375 meters (43.88 feet) from the station in azimuth $356^{\circ}03'$. Other distances and azimuths are as follows: Helen's windmill, about one-half mile, $71^{\circ}22'$; J. W. Watt's windmill, about one-fourth of a mile, $99^{\circ}42'$; *Roscoe, schoolhouse cupola*, about 8 miles, $159^{\circ}03'08''$. Elevation of station, 792.6 meters (2,600 feet).

Bench (Nolan County, J. S. Hill, 1909).—Ten miles south and west from Roscoe and 12 miles southeast from Loraine, towns on the Texas & Pacific Railway, and on the highest point of the western end of a prominent flat-top peak known as Bench Mountain, which is the second point from the northwestern end of the ridge. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), and is 17.092 meters (56.08 feet) from the station, in azimuth $243^{\circ}04'$. Other distances and azimuths are as follows: P. R. Key's house, pinnacle, about 2 miles, $84^{\circ}40'$; M. A. Dougherty's house chimney, about $1\frac{1}{2}$ miles, $140^{\circ}20'$; *Roscoe, schoolhouse cupola*, about 9.7 miles, $188^{\circ}34'01''$. Elevation of station, 793.4 meters (2,603 feet).

Wolf (Mitchell County, J. S. Hill, 1909).—Five miles north of Loraine, a town on the Texas & Pacific Railway, and one-half mile west of the Loraine-Snyder public road, on the property of Walter Tubbs and on the western 1 of 2 very prominent peaks known as the "Lone Wolf Mountains." Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is old type station mark set in bedrock, note 8 (aa). Reference mark is spike in iron pipe set in concrete, is described in note 42 (b), and is 13.350 meters (43.80 feet) from the station, in azimuth $185^{\circ}59'$. Other distances and azimuths are as follows: Windmill about 1 mile, $271^{\circ}58'35''$; windmill about $1\frac{1}{2}$ miles, $123^{\circ}12'49''$; well stand, about 200 meters (656 feet), $233^{\circ}35'28''$; *Loraine, schoolhouse cupola*, about 11 miles, $337^{\circ}00'21''$. Elevation of station, 751.6 meters (2,466 feet).

Bynum (Mitchell County, J. S. Hill, 1909).—Three miles south of Westbrook, a town on the Texas & Pacific Railway, on a round-top hill in a pasture belonging to G. D. Bynum, of Colorado, Tex., and about 170 meters (558 feet) west of his tenant house. There are a few scattered mesquite trees on the hill. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark, of same type as station marks, is described in note 42 (a), and is 14.612 meters (47.94 feet), from the station, in azimuth $356^{\circ}44'$. Following distances and azimuths are from station: South gable of Boswell's house, distant about 230 meters (755 feet), in azimuth $270^{\circ}10'$; *Morgans Peak*, 3 miles, $131^{\circ}30'58''$; *Westbrook, Methodist Church, spire*, 2.7 miles, $161^{\circ}42'44''$. Elevation of station, 698.0 meters (2,290 feet).

Cuthbert (Mitchell County, J. S. Hill, 1909).—In the town of Cuthbert, 15 miles by road northwest of Colorado, a town on the Texas & Pacific Railway, on a lot owned by D. T. Bozeman, postmaster of the town, and 1 meter (3 feet) south of the south side of the main east-and-west road through the town. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark is of same general type as station marks, is described in note 42 (a), and is 14.330 meters (47.01 feet), from the station, in azimuth $270^{\circ}58'$. Other distances and azimuths are as follows: Schoolhouse, about 250 meters (820 feet), $312^{\circ}46'34''$; flagstaff on Bozeman's store, about 90 meters (295 feet), $48^{\circ}57'$; center of church, about 150 meters (492 feet), $109^{\circ}50'25''$. Elevation of station, 687.0 meters (2,254 feet).

Top (Howard County, J. S. Hill, 1909).—Ten miles north and 3 miles east of Coahoma, a town on the Texas & Pacific Railway, on the north end and highest point of Flat Top Mountain and in a large pasture. There is an east-and-west wagon road about one-fourth of a mile south of the station. Surface mark is large nail in iron pipe set in concrete, note 21 (a); underground mark is similar to surface mark, and is described in note 32 (a). Reference mark, of same general type as station marks, is described in note 42 (a), and is 16.936 meters (55.56 feet) from the station, in azimuth $15^{\circ}08'$. The southeast point of the mountain is about 400 meters (1,312 feet) distant, in azimuth $5^{\circ}23'22''$; *Muchakooago* (*Mushaway*) Peak, is distant about 6.8 miles, in azimuth $157^{\circ}35'33''$. Elevation of station, 769.7 meters (2,525 feet).

Signal (Howard County, J. S. Hill, 1909).—Eight miles south of Coahoma, a town on the Texas & Pacific Railway, on the northern end of Signal Mountain, which is the first peak south of Signal Peak, a peak conspicuous for its conical shape. The distance between the 2 peaks is about 600 meters (1,968 feet). Surface mark is large nail in iron pipe set in concrete, note 21 (b); underground mark is an iron spike set in a drill hole as described in note 8 (d), the nail in the underground mark being 15 inches below the surface. The reference mark, a 2-inch hole, 3 inches deep, drilled in a ledge of rock on the northwest edge of the mountain, is 29.90 meters (98.1 feet) from the station in azimuth $138^{\circ}38'$. Elevation of station, 834.4 meters (2,738 feet).

Ewart (Howard County, J. S. Hill, 1909; 1932).—Seven and one-half miles due north of Big Spring, a town on the Texas & Pacific Railway, and one-third mile east of the Big Spring-Tahoka public road, on land owned by G. C. Black, which was formerly known as the old Ewart place. Station is 162 feet northeast of a farmhouse, 16 feet west of fence line, and 16 feet south of chicken yard fence. Surface mark is a cap station mark on a 3-inch pipe, note 22 (a); it projects about 4 inches above the ground. Underground mark is a large nail in an iron pipe set in concrete as described in note 32 (b). Reference mark, a large nail in iron pipe set in concrete, note 42 (a), is 60.441 meters (198.30 feet) from station, in azimuth $180^{\circ}18'23''$. To reach station from Big Spring go north on United States route 385 a distance of $7\frac{3}{4}$ miles from bridge over railroad to point where highway turns west. Go west from this point 1.0 mile to road intersection and station site. Elevation of station, 817.1 meters (2,681 feet).

Williams (Howard County, J. S. Hill, 1909; 1932).—Four miles direct, or 6 miles by road south of Big Spring, a large town on the Texas and Pacific Railway, on the highest point of a north-and-south ridge, on land owned by Jim Williams, of Big Spring, 16.5 feet north of an east-and-west fence line, 70 feet east of a concrete culvert and cattle guard, and 36 feet east of a road running along the ridge. Station was marked underground with an old type station mark set in a drill hole, note 8 (aa). The surface mark was a large nail in an iron pipe set in concrete. In 1932 the station was re-marked according to note 1 (a), a standard disk station mark in concrete, set flush with surface of ground. The 1909 reference mark reported destroyed. Reference marks set in 1932 are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above the ground, and is in fence line, about 0.15 mile from station, in azimuth $226^{\circ}14'55''$. No. 2 projects 3 inches above ground, is 15 feet west of center of road, 14 feet north of a small mesquite tree, and 219.3 feet from station, in azimuth $359^{\circ}56'22''$. The azimuth from the station of the *Stanton municipal water tank, final*, is $78^{\circ}48'38''$. To reach the station from Big Spring, go south on United States route 385 from Third and Scurry Streets 2.4 miles to City Park entrance; turn left and go 1.6 miles to fork; take right fork 0.35 miles to another fork; take left fork and go 0.6

mile to fork just beyond jog to right of old road; follow left fork 0.7 mile to cattle guard and station site. Elevation of station, 865.3 meters (2,839 feet).

Stanton (Martin County, J. S. Hill, 1909; 1932).—About 1 mile S. 54° E. from the city water tower at Stanton, a town on the Texas & Pacific Railway, on the highest point of a narrow ridge running north and south and about one-half mile south of the railroad. In 1909 surface mark was a cap station mark on an iron pipe, note 22 (a); underground mark is large nail in iron pipe, set in concrete as described in note 32 (b). Reference mark, a large nail in iron pipe set in concrete, note 42 (a), is 20.27 meters (66.5 feet) from the station, in azimuth 64°06'. Station recovered in 1932. Surface mark had been destroyed, but underground mark was in good condition. Station was re-marked with standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark (1909) was recovered, battered, but apparently in position. Two new reference marks were placed, standard reference disks in concrete, note 11 (a). No. 1 is in a north-and-south fence line, 354.85 feet from station, in azimuth 249°10'17''. No. 2 is in an east-and-west fence line, 0.1 mile (paced distance) from station, in azimuth 356°36'57''. Other azimuths from the station are: *Airways beacon no. 26*, third one west from Big Spring, 71°59'17''; *Stanton, Martin County courthouse, tip of dome*, 109°54'00''; *Stanton municipal water tank, finial*, 111°18'53''; *airways beacon*, second one west of Big Spring, at emergency landing field 5 miles north of Stanton, 135°23'45''; *airways beacon*, first one west of Big Spring, at airdrome, 243°19'37''. *Stanton longitude station*, 2.26 meters (7.4 feet) south of the station, was found in poor condition. The disk had been removed and the lower part of the mark mutilated. The shack over this station was torn down in order to build the tower over the triangulation station. Elevation of station, 825.59 meters (2,708.6 feet).

Epley (Martin County, J. S. Hill, 1909; 1932).—Eleven miles direct, or 12½ miles by road north-northwest from Stanton, a town on the Texas & Pacific Railway, 1.25 miles west of the Stanton-Lamesa public road, on the highest elevation in the vicinity and on land owned by a Mr. Norton, of New York. Surface mark is cap station mark on an iron pipe, note 22 (a); underground mark is large nail in iron pipe set in concrete as described in note 32 (b). Reference mark, a large nail in iron pipe set in concrete, note 42 (a), is 20.70 meters (67.9 feet) from the station, in azimuth 89°45'. Other distances and azimuths are as follows: Chimney of A. L. Graham's house, about 1¼ miles, 0°59'; chimney of Walker's house, about one-half mile, 84°28'. In 1932 station recovered, marks in good condition. The Walker house had been torn down. A new reference mark was set, a standard reference disk in concrete, note 11 (a), in an east-and-west fence line, 460 meters (1,509 feet) from station, in azimuth 199°35'48''. It was called no. 1. Other azimuths determined from the station are: *Airways beacon*, first west of Big Spring, at airdrome, 278°08'35''; *airways beacon*, second west of Big Spring, at emergency landing field 5 miles north of Stanton, 337°04'16''; *Stanton, Martin County courthouse, tip of dome*, 334°54'02''; *Stanton municipal water tank, finial*, 334°54'54''. Elevation of station, 869.2 meters (2,852 feet).

Stanton south base (Martin County, J. S. Hill, 1909).—Seven and one-eighth miles direct, or 7½ miles by road, west-southwest from Stanton, a town on the Texas & Pacific Railway, and two-thirds of a mile north of the railroad on level, clear prairie land. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is an old type station mark set in drill hole, and is described in note 8 (aa). Reference mark is a large nail in iron pipe set in concrete, is described in note 42 (a), and is 29.590 meters (97.08 feet) from the station, in azimuth 148°13'. Elevation of station, 821.20 meters (2,694.2 feet).

Stanton north base (Martin County, J. S. Hill, 1909).—Eleven miles direct, or 14 miles by road, west-northwest from Stanton, a town on the Texas & Pacific Railway, and about 2 miles west of the Stanton-Gaines County public road, on the highest part of a small bare knoll, in the pasture of J. E. Henson. Surface mark is a cap station mark screwed to top of a 3-inch iron pipe, as described in note 22 (a), except that the cylinder of concrete is 24 inches in diameter instead of 20; underground mark is large nail in iron pipe set in concrete, and is described in note 32 (b). Reference mark is large nail in iron pipe set in concrete, note 42 (a), and is 23.550 meters (77.26 feet) from the station, in azimuth 327°20'. Elevation of station, 853.04 meters (2,798.7 feet).

Elkins (Midland County, J. S. Hill, 1909).—Four and one-half miles direct, or 6 miles by road, northeast of Midland, a town on the Texas & Pacific Railway, on the property of Frank Elkins, of Midland, 1¼ miles north of the railroad and on the highest point of the south end of a north-and-south ridge. Surface mark is a cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground

mark is large nail in iron pipe set in concrete, note 32 (b). Reference mark is large nail in iron pipe set in concrete, note 42 (a), and is 24.662 meters (80.91 feet) from the station in azimuth 162°09'. Other distances and azimuths are as follows: Smith's windmill, 1¼ miles, 358°14'01''; chimney on house, one-half mile, 16°56'39''; Midland, *courthouse cupola*, 4½ miles, 47°02'19''; Midland, Baptist church, 4½ miles, 47°32'29''. Elevation of station, 858.9 meters (2,818 feet).

Dunn (Martin County, J. S. Hill, 1909).—Fourteen miles by road, or 11 miles direct, north-northwest from Midland, a town on the Texas & Pacific Railway, and 1½ miles west of the Midland-Seminole public road. It is on south side of large pasture owned by Ole Dunn and about 10 meters (33 feet) north of an east-and-west fence, which is south-line fence of Mr. Dunn's property. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is an old-type station mark set in drill hole, and is described in note 8 (aa). Reference mark, a large nail in iron pipe set in concrete, is described in note 42 (a), and is in above-mentioned fence line and 23.593 meters (77.40 feet) from station in azimuth 271°45'. Azimuth from station of Midland, *courthouse cupola*, distant about 11 miles, is 340°44'00''. Elevation of station, 886.9 meters (2,910 feet).

Scar (Midland County, J. S. Hill, 1909).—Seven miles west of Midland, 3 miles east of Warfield, towns on the Texas & Pacific Railway, and one-half mile south of the railway, on a round knoll in cultivated field, the property of the Scarborough Cattle Co. of Midland. Surface mark is cap station mark screwed onto 3-inch iron pipe, note 22 (a); underground mark is a standard disk station mark set in concrete block, note 7 (a). Reference mark is an iron rod in concrete cylinder, note 43; it is 38.161 meters (125.20 feet) from station, in azimuth 271°37'. Following distances and azimuths are from station: Windmill, 8.53 meters (28.0 feet), 331°57'; Warfield, section house, south chimney, about 3 miles, 67°47'41''; Midland, *courthouse cupola*, about 7 miles, 233°03'21''. Elevation of station, 880.79 meters (2,889.7 feet).

Morris (Ector County, J. S. Hill, 1909).—Seventeen miles by road, or 14 miles direct, west by north from Midland, a town on the Texas & Pacific Railway, in the C. Morris pasture, known as the "C" pasture, and on the highest knoll in the vicinity. It is one-half mile east of R. A. Anderson's east-line fence. Surface mark is cap station mark screwed to a 3-inch iron pipe, note 22 (a); underground mark is an old-type station mark set in concrete. Reference mark is large nail in iron pipe set in concrete, note 42 (a); it is 29.615 meters (97.16 feet) from the station, in azimuth 352°51'. Two windmills in the Morris pasture are at the following distances and azimuths from the station: About 1½ miles, 276°58'20''; about 2 miles, 337°57'34''. Azimuth from station to Anderson's house, north gable, distant about 1¼ miles, 58°47'45''. Elevation of station, 906.3 meters (2,973 feet).

Bates (Ector County, J. S. Hill, 1909).—Nine and one-half miles direct, or 10 miles by road, north-northeast from Odessa, a town on the Texas & Pacific Railway, near a large round depression in the top of a ridge, and on the "Old Bates Ranch", now owned by H. S. Ratliff. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground mark is standard disk station mark set in concrete block, note 7 (a). Reference mark is an iron rod in a concrete cylinder, note 43; it is 18.945 meters (62.16 feet) from the station in azimuth 350°56'. Other distances and azimuths are as follows: Center of depression 550 meters (1,804 feet), 287°; center of the old Bates ranch house, about 1½ miles, 64°39'. Elevation of station, 914.1 meters (2,999 feet).

Odessa (Ector County, J. S. Hill, 1909; 1927).—Two miles east of Odessa, a town on the Texas & Pacific Railway, and 1 mile north of a railway crossing, on the highest point of a low bare knoll in the pasture of C. P. Turner and one-half mile north of his house. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground mark is standard disk station mark set in concrete block, note 7 (a). Reference mark is an iron rod in a concrete cylinder, note 43; it is 19.145 meters (62.81 feet) from the station, in azimuth 247°00'. Azimuth from station to Odessa, *courthouse cupola*, 1½ miles, is 46°19'00''. In 1927 the reference mark was recovered intact; the surface mark could not be found and the underground mark was not searched for. It was reported that in 1917 a deep test well had been sunk within a few feet of the station mark, which was said to have been in position when drilling commenced. Elevation of station, 898.70 meters (2,948.5 feet).

Smith (Ector County, J. S. Hill, 1909; 1912).—Ten and one-half miles direct, or 14 miles by road, northwest by north from Odessa, a town on the Texas & Pacific Railway, three-fourths mile west of the main county road, on the ranch

owned by R. W. Smith and 1 mile southwest of his residence. Surface mark is cap station mark on an iron pipe, note 22 (a); underground mark is standard disk station mark set in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 20.684 meters (67.86 feet) from the station, in azimuth $88^{\circ}12'$. Smith's windmill is about three-fourths mile from the station in azimuth $204^{\circ}19'$. Azimuth from station to *Odessa, courthouse cupola*, about 7 miles, $327^{\circ}35'53''$. Azimuth observations made at triangulation station in 1912; latitude station of 1912 was 2.075 meters (6.81 feet) due west of triangulation station. Elevation of station, 921.0 meters (3,022 feet).

Dublin (Ector County, J. S. Hill, 1909).—Sixteen and one-half miles direct, or 20 miles by road, N. 85° W. from Odessa, a town on the Texas & Pacific Railway, and 5 miles S. 75° W. from the ranch house of J. W. Buchanan. It is on the west side of pasture owned by the Dublin brothers, 20 meters (66 feet) south of the wagon road leading through their pasture from Buchanan's ranch, and about 30 meters (98 feet) southeast of the gate where road enters pasture to the westward. Surface mark is a cap station mark on an iron pipe set in concrete, note 22 (a); underground mark is old-type station mark set in drill hole, note 8 (aa). Reference mark is iron rod in concrete cylinder, note 43; it is 17.780 meters (58.33 feet) from station, in azimuth $347^{\circ}30'$. Azimuth from station of *windmill 2 miles south*, $349^{\circ}58'24''$. Elevation of station, 979.4 meters (3,213 feet).

Douro (Ector County, J. S. Hill, 1909).—Four miles direct, across pasture, S. 2° W. from Douro, a station of the Texas & Pacific Railway, on round-topped knoll near the south edge of large plateau and on the property of Mr. Henderson, about one-third mile south-by-east from his ranch house. Station mark is cap station mark screwed on top of 3-inch pipe, note 22 (a); underground mark is standard disk station mark in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 20.541 meters (67.39 feet) from station in azimuth $259^{\circ}40'$. Following distances and azimuths are from station: *Windmill* at Henderson's west ranch house, about 500 meters (1,640 feet), $166^{\circ}40'56''$; *Douro, section house, east dwelling*, 4 miles, $181^{\circ}37'56''$; *Judkin, schoolhouse cupola*, 6.4 miles, $94^{\circ}30'20''$. Elevation of station, 935.4 meters (3,069 feet).

Curtis (Crane County, J. S. Hill, 1909).—Eight miles direct, or 10 miles by road, directly south of Judkin, about 7 miles direct, south and east from Metz, towns on the Texas & Pacific Railway, and very near the southern end of a prominent narrow ridge which extends 4 miles northwest and southeast from the J. A. Graham ranch house. The station is on the "O4" pasture, owned by Mrs. A. G. Curtis, of Midland. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is an iron spike set in bedrock, note 8 (d). Reference mark is iron rod in concrete cylinder, note 43; it is 13.757 meters (45.13 feet) from the station, in azimuth $266^{\circ}08'$. The eastern one of two windmills is about 1 mile distant in azimuth $336^{\circ}26'54''$. Azimuth from station of *Judkin, schoolhouse cupola*, distant about 7.3 miles, is $178^{\circ}45'46''$. Elevation of station, 870.3 meters (2,855 feet).

Harris (Winkler County, J. S. Hill, 1909).—Nine miles direct, or $10\frac{1}{2}$ miles by road, N. 83° W. from Metz, a railway station on the Texas & Pacific Railway, 3 miles N. 55° W. from the Judge Murphy cattle pens, where there are 4 windmills, and on land owned by M. W. Harris, who lives 1 mile north by east of the station. The station is 150 meters (492 feet) west from the southeast corner of the four-section claim of Mr. Harris and just north of a line of old fence posts to which no wire is attached. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is a large nail in iron pipe set in concrete, note 32 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 16.065 meters (52.71 feet) from the station, in azimuth $232^{\circ}39'$. Other distances and azimuths are as follows: *Harris ranch windmill*, about 2 miles, $110^{\circ}16'57''$; *windmill*, about 1 mile, $201^{\circ}15'42''$. Elevation of station, 880.6 meters (2,889 feet).

Estes (Ward County, J. S. Hill, 1909, 1928).—Seven and one-fourth miles direct, or 9 miles by road, southwest by south from Monahans, a town on the Texas & Pacific Railway, $5\frac{1}{2}$ miles direct, S. 10° E. from the section house at Aroya switch on the same railroad, on land owned by E. W. Estes and 400 meters (1,312 feet) northeast of his house. The windmill and cottonwood trees at Mr. Estes' house may be seen from Monahans, the trees being very prominent and the only ones in the vicinity. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is an iron spike in bedrock, note 8 (d). Reference mark is iron rod in concrete cylinder, note 43; it is 21.729 meters (71.29 feet) from the station, in azimuth $276^{\circ}02'$. Estes' windmill is about one-fourth of a mile from the station in azimuth $31^{\circ}00'16''$. Station recovered in 1914. Station

mark recovered in good condition in 1928, at which time reference mark could not be found. Elevation of station, 797.4 meters (2,616 feet).

Aroya (Ward County, J. S. Hill, 1909).—Nine miles direct, or $11\frac{1}{2}$ miles by road, west-northwest from Monahans, a town on the Texas & Pacific Railway, 6 miles direct, N. 35° W. from the section house at Aroya switch on the same railroad, and on the highest point of a flat-top knoll in the McElroy pasture. Surface mark is a cap station mark on an iron pipe, note 22 (a); underground mark is an iron spike in bedrock, note 8 (d). Reference mark is iron rod in concrete cylinder, note 43; it is 15.714 meters (51.56 feet) from the station, in azimuth $76^{\circ}27'$. The center of a water tank is about $1\frac{1}{4}$ miles distant in azimuth $172^{\circ}38'$. Elevation of station, 834.4 meters (2,738 feet).

Lee (Ward County, J. S. Hill, 1909, 1928).—Seven miles direct, or $7\frac{1}{2}$ miles by road, southwest from Pyote, a small town on the Texas & Pacific Railway, on the highest point of a prominent ridge, and on the property of Capt. J. M. Lee, who lives about 2 miles west of the station. The ridge on which the station is located is the more distant one of the two ridges southwest of Pyote. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in rock, note 9 (a). The reference mark, a $1\frac{1}{2}$ -inch hole drilled in the top of a natural white limestone rock, is 16.643 meters (54.60 feet) from the station, in azimuth $228^{\circ}12'$. Other distances and azimuths are as follows: Railway pumping station, about 3 miles, $155^{\circ}09'07''$; windmill, about 1 mile, $260^{\circ}19'51''$; station was recovered in good condition in 1928. Elevation of station, 827.1 meters (2,714 feet).

Johnson (Ward County, J. S. Hill, 1909).—Eleven miles direct, or 13 miles by road, north-northeast from Barstow, a town on the Texas & Pacific Railway, in the "W" pasture, and one-fourth mile west by north of the road leading through this pasture from Barstow. It is 4 miles north by east of the gate where the road enters the "W" pasture, on the highest point of a ridge on a spur projecting to the southwest from the main ridge and near its southwest end. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 a; underground mark is standard disk station mark in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 19.024 meters (62.41 feet) from the station in azimuth $167^{\circ}55'$. The center of a tank at a group of three windmills is about $1\frac{1}{2}$ miles distant in azimuth $213^{\circ}49'$. Azimuth from station to *Barstow courthouse cupola*, is $23^{\circ}03'28''$. Elevation of station, 869.8 meters (2,854 feet).

Hays (Ward County, J. S. Hill, 1909; 1928).—Four and one-half miles direct, northeast by east from Barstow, a town on the Texas & Pacific Railway, on the northwest corner and highest point of the first very prominent hill northeast of Barstow. It is $1\frac{1}{4}$ miles N. 28° W. from the Roger's rock quarry, and in the pasture of N. L. Hays, whose ranch house is S. 55° E. from the station and 1 mile distant. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground mark is standard disk station mark in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 19.365 meters (63.53 feet) from the station in azimuth $55^{\circ}53'$. Azimuth from station to *Barstow courthouse cupola*, distant about 4.4 miles, is $54^{\circ}39'00''$. In 1928 station mark recovered intact, but reference mark could not be found; it had apparently been destroyed through weathering of the hill on which station is located. Elevation of station, 853.20 meters (2,799.2 feet).

Ingle (Reeves County, J. S. Hill, 1909; 1931).—Twelve and one-half miles direct, or 13 miles by road north-northwest of Pecos, a town on the Texas & Pacific Railway, and 38 meters (125 feet) west of the "Hill" public road, which is parallel to and west of the Pecos Valley Southern Railway. From the north, the extension of the tangent of road runs directly over station. It is on a prominent round-topped hill, 4 miles north of where road crosses deep draw in which are a windmill and ranch house owned by a Mr. Engle. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground mark is standard disk station mark in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 21.278 meters (69.81 feet) from station in azimuth $22^{\circ}30'$. Following distances and azimuths are from station: Windmill, about 1 mile, $32^{\circ}10'$; *Barstow courthouse cupola*, $308^{\circ}47'10''$; *Pecos courthouse cupola*, distant about $11\frac{1}{2}$ miles, $334^{\circ}25'47''$. Elevation of station, 835.1 meters (2,740 feet).

Sist (Reeves County, J. S. Hill, 1909; 1922).—Four and three-fourths miles direct, or 5 miles by road, S. 3° W. from the courthouse in Pecos, a town on the Texas & Pacific Railway, and 500 meters (1,640 feet) west of the Pecos-Fort Stockton Road, on the 4-section claim of T. J. Sisk, who lives about 200 meters

(656 feet) southeast of the station. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (a); underground mark is standard disk station mark in concrete block, note 7 (a). Reference mark is iron rod in concrete cylinder, note 43; it is in the northwest corner of a lot, and 35.900 meters (117.78 feet) from the station in azimuth $10^{\circ}58'$. Sisk's windmill is about 75 meters (246 feet) from the station in azimuth $328^{\circ}04'$. Azimuth from station to *Barstow courthouse cupola*, about $9\frac{1}{2}$ miles distant, is $220^{\circ}29'41''$. Elevation of station, 797.7 meters (2,617 feet).

Round (Reeves County, J. S. Hill, 1909; 1922).—Twelve miles direct, or 14 miles by road north-northwest from Toyah, a town on the Texas & Pacific Railway, and on a very prominent hill, visible from Toyah, known as Round Mountain, which is in a pasture owned by Dug Coalson and $1\frac{1}{2}$ miles northeast of his house. To reach the station from Toyah, go north and west on the "Dug Coalson" road to his house and from there to the top of the mountain. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in boulder, note 9 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 16.236 meters (53.27 feet) from the station in azimuth $196^{\circ}55'$. Station recovered in 1914 and again, as described, in 1922. Elevation of station, 990.9 meters (3,251 feet).

Toyah (Reeves County, J. S. Hill, 1909; 1931).—Fourteen and three-fourths miles by road, or 13 miles direct, S. 7° W. from Toyah, a town on the Texas & Pacific Railway and three-fourths mile east of the Toyah-Toyahvale road. It is on the highest and most southwesterly hill in the vicinity and 8 feet south of a conical pile of rocks on this hill. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in boulder, note 9 (a). Reference mark is iron rod in concrete cylinder, note 43; it is 15.15 meters (49.70 feet) from the station in azimuth $350^{\circ}46'$. In 1931 station was recovered as described. Elevation of station, 1,029.5 meters (3,378 feet).

Seay (Culberson County, J. S. Hill, 1909; 1931).—Thirteen miles direct, or about 17 miles by road, N. 54° W. from the section house at San Martine, a station on the Texas & Pacific Railway, on the highest peak of a high group of hills, and in the west pasture of J. P. Seay, who lives 7 miles north of San Martine at the "Seven Heart" ranch house. The peak has a dome-shaped top about 120 meters (394 feet) across. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in boulder, note 9 (a). The reference mark, a cross cut in the top of a flat rock flush with the surface of the ground, is 10.67 meters (35.0 feet) from the station in azimuth $254^{\circ}27'$. Two windmills about 3 miles from the station are in azimuth $30^{\circ}00'$. Station was recovered, as described, in 1931. Elevation of station, 1,226.6 meters (4,024 feet).

Newman (Jeff Davis County, J. S. Hill, 1909; 1931).—This station is near the United States Geological Survey station of the same name. It is 11 miles direct, S. 3° E. from the section house at San Martine, a station on the Texas & Pacific Railway, about 2 miles south of the northwest end of the Davis Mountains, and about 2 miles south by east of J. W. McElroy's place. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b). Underground mark is standard disk station mark in rock, note 9 (a). The reference mark is a 20-penny nail driven flush in the top of a hard rock at the edge of a bluff and is 26.125 meters (85.71 feet) from the station in azimuth $223^{\circ}17'$. Other distances and azimuths are as follows: High peak, about three-fourths of a mile, $263^{\circ}35'$; *Newman (U.S.G.S.)* (see description thereof), 361.0 meters (1,184 feet), $55^{\circ}40'03''$; *Gomez Peak*, about $1\frac{1}{2}$ miles, $188^{\circ}14'53''$. A blazed pine tree is 2.04 meters (6.7 feet) east of the station. Station recovered in 1917, and again, as described, in 1931. Elevation of station, 1,947.8 meters (6,390 feet).

Reynolds (Culberson County, J. S. Hill, 1909; 1911).—Seven and one-half miles north by east of Boracho, 11 miles direct northwest from Kent, small towns on the Texas & Pacific Railway, and on the highest point of the highest peak near the center of a very prominent high ridge which is about 7 miles north of the railroad and parallel to it. It is in the pasture of the Reynolds Cattle & Land Co. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in rock, note 9 (a). The reference mark, a cross cut in the top of a flat rock flush with the ground, is 14.28 meters (46.9 feet) from the station in azimuth $19^{\circ}51'$. Elevation of station, 1,642.7 meters (5,389 feet).

Krouse (Culberson County, J. S. Hill, 1909; 1934).—This station is near the United States Geological Survey station of the same name. It is $8\frac{1}{2}$ miles north by west from Boracho, a station on the Texas & Pacific Railway, and on the highest peak near the western end of a very prominent ridge which is about 7 miles north of the railroad and parallel to it. The station is about 1 mile east of the Krouse zinc mines. Surface mark is cap station mark screwed to top of 3-inch iron pipe, note 22 (b); underground mark is standard disk station mark in rock, note 9 (a). The reference mark, a cross cut in the top of a rock flush with the ground, is 6.49 meters (21.3 feet) from the station in azimuth $95^{\circ}18'$. Station *Krouse* (U.S.G.S.) *cairn* (see description thereof) is 4.16 meters (13.6 feet) distant in azimuth $68^{\circ}42'$. Elevation of station, 1,724.27 meters (5,657.0 feet).

Chispa (Culberson County, J. S. Hill, 1909; 1934).—About 18 miles southwest of Van Horn, $4\frac{1}{4}$ miles north by west of Chispa, a station on the Southern Pacific Railway, on Chispa Mountain, highest peak of mountain group, just south of Wylie Range and east of Van Horn Range, and 2 miles northeast of railway at its nearest point. Station is near United States Geological Survey station of same name and is identical with one of reference marks of this station. To reach from Van Horn, go south on United States route 90 about 25 miles to Chispa railway station (only a section house), thence 0.3 mile northwest to railway crossing, cross tracks and pass through wooden gate, then left taking road northwestward along fence 0.75 mile. About 200 feet beyond rock-strewn, barren area turn right (north) 2.35 miles on dim road toward Chispa Mountain, keeping to left side up fairly wide valley, cross wire fence, and continue up valley on left side to end of truck travel 0.8 mile from fence. Leave truck at this point and follow slope to eastward, thence northward up slope to station site about 1 mile from truck and a 1-hour pack. Station mark is U.S.G.S. bronze bench-mark disk set in bedrock stamped "U. S. C. & G. S. 1909-1934." A reference mark of United States Geological Survey, cross cut in top of large flat rock, is 5.51 meters (18.1 feet) from station in azimuth $336^{\circ}51'$. A United States Geological Survey *cairn* is about 3 meters (10 feet) from station in azimuth $312^{\circ}19'$. In 1934 two new reference marks and an azimuth mark, standard reference disks in bedrock, note 12 (a), were established. No. 1 is 6.58 meters (21.6 feet) (slope distance) from station in azimuth $260^{\circ}00'$. No. 2, very near and probably identical with old cross cut in rock mentioned above, is 5.49 meters (18.0 feet) from station in azimuth $336^{\circ}36'$. Azimuth mark, on first small peak of same mountain west-southwest of station, is about one-fourth mile from station in azimuth $83^{\circ}54'21''$. Azimuth from station to chimney-shaped peak, distant about $5\frac{1}{2}$ miles, is $31^{\circ}08'23''$. Bench mark P23, on east side of highway, about 0.2 mile west of Danube, on Southern Pacific Railway, at milepost 690, about 65 feet south of track, marked by standard bench-mark disk set in top of concrete post, is about 3 miles distant in azimuth $109^{\circ}03'40''$. Elevation of bench mark is 1,233.013 meters (4,045.31 feet). Elevation of station, 1,585.00 meters (5,200.1 feet).

Diablo (Hudspeth County, J. S. Hill, 1909; 1934).—About 12 miles north by west of Van Horn, $9\frac{1}{2}$ miles direct, or 13 miles by road north by east from Allamore, a station on the Texas & Pacific Railway, about 2 miles north by west of the Hazel Mine, 2 miles west of Texas Highway 54, on eastern one of two peaks near southern end of Diablo Mountains. To reach from Van Horn, from intersection of route 54 and United States route 80 at Magnolia petroleum service station go north 0.55 mile on route 54 to Toolens camp ground, turn right (east) on route 54 and go 0.5 mile, turn left (north) and follow route 54 10.5 miles to cattle guard and road to left just south of cattle guard. There is also a large sign, "Hazel Silver Mine—World Exploration Co." on left side of road at this point. A similar sign, in stream bed, is one-fourth mile south of this point. Turn left on road 0.95 mile, cross stream bed and follow road westward 0.6 mile to Allan Hall (B Bar) Ranch, go to right through gate and follow road 2.55 miles to Hazel Silver Mine. From mine go west 0.4 mile to two hoists on west bank of creek bed and continue west 0.4 mile to gate. Just after passing through gate turn right and go north and northwest on dim road 0.5 mile to end of truck travel. From this point two canyons can be seen to north. There is high rim rock on both sides of east canyon. That on east side is directly north of the mine. Station can be reached by going up either canyon. The left canyon is shorter but steeper of two routes. Go up right or east canyon and climb to top of ridge at its head, thence west over two hills, thence north over divide at northwest foot of second hill and continue north to top of high ridge. From top of ridge go north to station site on highest peak of ridge which is fourth one from south end of high ridge. The southernmost peak can be seen after climbing out of canyon.

Station can be seen from highway before turning left on dirt road, appearing as most northerly and highest of four knobs, on highest ridge to northwest. Station is 27 feet west of east edge of hill, marked by standard disk station mark in bedrock, note 2. Reference mark of *Diablo (U.S.G.S.) cairn*, cross cut in ledge of rock, is 7.83 meters (25.7 feet) from station in azimuth $234^{\circ}13'$. In 1934, two new reference marks, standard reference disks in bedrock, note 12 (a), were established. No. 1, very near and probably identical with old reference mark, cross cut in rock mentioned above, is 16.6 feet northeast of center of *Diablo (U.S.G.S.) cairn*, and 25.75 feet from station in azimuth $233^{\circ}48'$. No. 2 is 61.8 feet northwest of cairn and 60.65 feet from station in azimuth $166^{\circ}49'$. *Diablo (U.S.G.S.) cairn* (see description thereof) is 3.28 meters (10.8 feet) from station in azimuth $256^{\circ}34'$. Elevation of station, 1,987.0 meters (6,519 feet).

Eagle (Hudspeth County, J. S. Hill, 1909).—On the highest peak of the Eagle Mountains, locally known as Eagle Peak, 25 miles southeast of Sierra Blanca, a town at the junction of the Southern Pacific and the Texas & Pacific Railways, and $8\frac{1}{2}$ miles direct, or 13 miles by road and trail west and south from Dalberg, a station on the Southern Pacific. It is 2 miles northwest of the "Francisco" sheep ranch, and on the same peak as station Eagle U.S.G.S., the marking of which could not be found. Station marked with standard disk station mark in bedrock, note 2. The reference mark, a cross cut in a rock over the edge of the hill, is 5.77 meters (18.9 feet) from the station in azimuth $177^{\circ}01'$. Azimuth from station to *Allamoore, tank*, distant about $11\frac{1}{4}$ miles, is $204^{\circ}27'26''$. In 1931 reported station mark destroyed, hole in ground being found. No reference mark found. Evidences of two large rock cairns having been destroyed. Station not to be considered truly lost. In 1934 station reported destroyed. A new station, Eagle 2, has been established in this locality. Elevation of station, 2,284.8 meters (7,496 feet.).

Quitman (Hudspeth County, J. S. Hill, 1909).—The station is on a high peak of the Quitman Mountains, near the United States Geological Survey station of the same name. It is $8\frac{1}{2}$ miles direct, or 10 miles by road, west by south from Sierra Blanca, a town at the junction of the Southern Pacific and the Texas & Pacific Railways, on the highest peak of the Quitman Mountains near the northern end of the Quitman Range, and in the pasture of the Love brothers. Station marked by standard disk station mark in bedrock, note 2. The reference mark, a cross cut in the top of a large rock, is 3.83 meters (12.6 feet) from the station in azimuth $357^{\circ}31'$. Station *Quitman (U.S.G.S.) cairn* (see description thereof) is 2.0 meters (7 feet) from the station in azimuth $210^{\circ}58'$. In 1934 reported that station has been destroyed and that new station, Quitman 2, has been established in same locality. Elevation of station, 2,038.3 meters (6,687 feet.).

Black (Hudspeth County, J. S. Hill, 1909; 1931).—Thirty miles direct and 35 miles by road, north-northeast from Sierra Blanca, a town at the junction of the Southern Pacific and the Texas & Pacific Railways, and on the highest and most southern point of the southeast end of a small range of isolated mountains known locally as the Black Mountains, but given as the Sierra Prieta Mountains on the United States Geological Survey map of this region. The station is about 400 meters (1,312 feet) south of the triangulation station Salt (U.S.G.S.), which is marked by a large rock on a very rough peak of about the same height as the one described above. Station marked by standard disk station mark in bedrock, note 2. The reference mark, a galvanized nail driven into a crevice in a rock 6 inches below its top and on the opposite side of the rock from the station, is 3.39 meters (11.1 feet) from the station, in azimuth $82^{\circ}53'$. Elevation of station, 1,695.0 meters (5,561 feet.).

Corduna (Otero County, N. Mex., J. S. Hill, 1909; 1931).—This station is near the United States Geological Survey station of the same name. It is about $1\frac{1}{2}$ miles north of the Texas-New Mexico boundary, 70 miles by road, or 60 miles direct, north of Sierra Blanca, a town at the junction of the Southern Pacific and the Texas Pacific Railways, and about 3 miles northeast of San Antonio peak, on the highest peak in the vicinity, known locally as Wind Mountain. Station was marked by standard disk station mark in bedrock, note 2. The reference mark, a cross cut in the top of a rock, is 4.63 meters (15.2 feet) from the station in azimuth $157^{\circ}43'$. Station *Corduna (U.S.G.S.) cairn* (see description thereof), is 7.8 meters (26 feet) from the station in azimuth $170^{\circ}48'$. In 1914 the station was recovered; the cairn marking the U.S.G.S. station was torn down, but rebuilt in approximately the same location. Elevation of station, 2,218.4 meters (7,278 feet.).

North Franklin (El Paso County, J. S. Hill, 1909; 1934).—About 10 miles direct or 16 miles by road and trail, north of El Paso, on highest peak of Franklin Mountains, which is smooth in appearance, rather pointed, and red in color, and as viewed from El Paso it is the second peak north of one which rises in El Paso. To reach station from El Paso, from intersection of Alameda Street (U.S. route 80) and North Piedras Street (U.S. route 70) go north 0.7 mile on United States route 70 to Pershing Drive. Here United States route 70 turns right on Pershing Drive. Follow United States route 70, 5.8 miles to Restlawn Cemetery and continue 1.8 miles to well-traveled dirt road, known as the Dona Ana Road, and sign "Indian Park and Cottonwood Springs." Here turn left and go 0.9 mile northwest on dirt road to fork, take left fork southwest and go 2.1 miles to gate at entrance of park, pass through gate and continue up canyon 0.7 mile to end of road. From this point pack up canyon to west, keeping well below and to north of high, prominent peak. After passing peak, bear to southwest and follow ridge to highest point and station site. This is a 2½-hour pack with a heavy load. Station is marked with United States Geological Survey bench mark disk cemented into a drill hole in solid rock, and is inscribed with elevation 7,141 feet. Old reference mark is highest point of upper one of two outcropping rocks on north side of ridge, 0.48 meter (1.6 feet) from south point, 0.47 meter (1.5 feet) from west point of rock, and 14.61 meters (47.9 feet) from station in azimuth 303°38'. Top of this rock is about 3 feet above top of lower rock which has precipitous face about 4 feet high on north side. In 1934 two new reference marks, standard reference disks in outcropping bedrock, note 12 (a), were established. No. 1 is 14.32 feet from station, in azimuth 290°21'. No. 2 is 54.36 feet (slope distance) from station in azimuth 25°01'. *North Franklin (U.S.G.S.) cairn* (see description thereof) is 2.9 meters (10 feet) from station, in azimuth 174°05'. In 1934, to reach station from post office at Canutillo, go east 0.3 mile, turn left and follow main-traveled road about 6 miles to mine, go southeast up the canyon about 1.5 miles, then switch back south to the top of the ridge, thence up the ridge to the southeast to its summit and station site. Elevation of station, 2,187.3 meters (7,176 feet).

Jarilla (Otero County, N.Mex., J. S. Hill, 1909; 1931).—On extreme south peak of Jarilla Mountain, about 2½ miles in direct line, N. 26° W. from railroad station at Orogrande, a town on the El Paso and Southwestern Railroad, 1 mile southwest of the Brice post office, and about one-half mile west of the railroad and wagon road which leads from Orogrande to the Brice post office and mines in that vicinity. To reach from El Paso, take State Highway 33, which is highway from El Paso to Alamogordo, N.Mex., to Orogrande, N.Mex.; here take road leading through town to Jarilla Mountains. Position of station is well known to residents of Orogrande, and can be pointed out from town. Station is marked by standard disk station mark in bedrock, note 2. Reference mark, center of iron pipe embedded in concrete, is 7.14 meters (23.4 feet) from station in azimuth 269°42'. A conical pile of rocks with stone at top bearing inscription "I.P. Jarilla U.S.M.M." is 9.72 meters (31.9 feet) from station in azimuth 275°42'. *Jarilla latitude and longitude station* (see description thereof) is 2.5 meters (8 feet) due east and 0.38 meter (1.2 feet) due south of station. Elevation of station, 1,478.1 meters (4,849 feet).

Kent (Dona Ana County, N.Mex., J. S. Hill, 1909; 1934).—About 22 miles direct or 25 miles by road northeast of Las Cruces, a town on the Santa Fe Central Railway, 9 miles northeast of the mountain town of Organ, 2 miles north of Kent post office, on most northern and highest one of three peaks close together on Black Mountain, which is a spur running east from the San Andreas Range just north of the San Augustine Pass. There is a mine on west side about 100 meters (328 feet) from top. To reach from Las Cruces, go north 14.6 miles on the Las Cruces-Alamogordo road (Highway 3) to Organ, continue 8.2 miles on Highway 3, thence left 1.3 miles on unimproved road to ranch, go through gate and continue past ranch buildings 0.15 mile to windmill on right; here take right fork and go 3.2 miles toward peak to spring in a small clump of scrub timber, turn sharp left and go 0.9 mile, then sharp left again, up wash, and 0.3 mile to end of truck travel. From this point pack up canyon to left of peak, then turn right up ridge to station site. This is about a 3-hour pack with very rough and steep going. Station marked by standard disk station mark in bedrock, note 2. Old reference mark, cross cut in top of flat rock 2 feet lower than station, is 6.86 meters (22.5 feet) from station in azimuth 160°15'. Azimuth from station to Alamogordo Peak is 213°06'04". In 1934 two new reference marks, standard reference disks in bedrock, note 12 (a), were established. No. 1, very near and

probably identical with old cross mentioned above, is 6.875 meters (22.56 feet) from station in azimuth $160^{\circ}53'$. No. 2 is 9.09 meters (29.8 feet) (slope) from station in azimuth $106^{\circ}07'$. Elevation of station, 2,132.7 meters (6,997 feet).

Cooks (Grant County, N. Mex., J. S. Hill, 1910).—On Cooks Peak, 20 miles in direct line north of Deming, a town on the Southern Pacific, and about 3 miles a little west of south from Cooks post office. It is best reached from Grover Bros. ranch, which is on east side of peak. Station marked with a standard disk station mark cemented into a drill hole in outcropping bedrock, note 2. Reference mark is a cross cut in rock, 11.62 meters (38.1 feet) from station in azimuth $202^{\circ}13'$. Elevation of station, 2,562.9 meters (8,408 feet).

Hermanas (Luna County, N. Mex., J. S. Hill, 1910).—On the highest one of four hills 3 miles south of Hermanas, a station and junction point on the El Paso & Southwestern Railroad. Station is marked with a standard disk station mark cemented into a drill hole in outcropping bedrock, note 2. Reference mark is cross cut in top of large boulder, 11.68 meters (38.3 feet) from station in azimuth $349^{\circ}10'$. Elevation of station, 1,611.0 meters (5,285 feet).

Florida (Grant County, N. Mex., J. S. Hill, 1910; 1933).—About 13.5 miles, air line, southeast of Deming, a town on the Southern Pacific, in sec. 24, T. 25 S., R. 8 W., on the Florida Mountains, about 500 meters (1,640 feet) south of highest rock peaks at north end of the mountains, on a flat-topped knob near center of first saddle south of the high rock peak at north end of mountain, and about 400 meters (1,312 feet) north of round-top peak, which is first prominent peak to south of those at north end. To reach from Las Cruces, go west 32.5 miles on United States route 80 to Cambray, crossing railroad just before arriving at Cambray. Continue west 4.15 miles on United States route 80 to town of Akela, and on 8.3 miles to an old engine on left side of highway and excavation work on both sides. There is also an old adobe house on the left edge of highway. Leave highway at this point and turn left on graded dirt road, follow this road south 5.0 miles to turn to left and continue in southeasterly direction 1.1 miles to gate and cattle guard at Birchfield ranch. Keep straight ahead to right of ranch buildings, go through another gate and continue 0.1 mile, take right fork and follow dim road 5.3 miles toward south end of mountain, here take right fork and go 0.6 mile to corral and small shack on left, take right fork 0.25 mile, then left fork 0.5 mile to Mr. English's camp which is as far as truck can be driven. From here it is about 2-hour pack up mountain to northwest to station site. Station marked by standard disk station mark cemented into drill hole in bedrock, note 2. In 1933 it was reported that disk had been broken off leaving shank intact. Reference mark, cross cut in rock, is 4.59 meters (15.1 feet) from station in azimuth $346^{\circ}41'$. Elevation of station, 2,145.0 meters (7,037 feet).

Cerro Alto (Hudspeth County, J. S. Hill, 1909; 1934).—On highest point of Cerro Alto, Hueco Mountains, about 40 miles a little north of east of El Paso, and just north of road leading from Cordunas Mountains to El Paso and passing near foot of Mud Peak. To reach from El Paso, follow United States route 62 (Carlsbad Road) about 35 miles to Pow Wow Camp on left side of road just after passing over summit of divide. This camp consists of two small gray houses owned by the State highway department. Turn left here and go 7.0 miles north on graveled road, take left fork 0.4 mile to ranch houses built of native stone, turn right, go through corrals and follow old road along foot of mountain about 0.7 mile to end of truck travel. From this point pack up right of two ridges to highest point and station site, about a 1-hour pack. Station marked by standard disk station mark set in concrete in depression in bedrock, note 3. Old reference mark, cross cut in top of large rock, is 4.17 meters (13.7 feet) from station in azimuth $339^{\circ}39'$. Station *Cerro Alto* (U.S.G.S.) (see description thereof) is 7.0 meters (23 feet) from station in azimuth $158^{\circ}50'$. In 1934 two new reference marks, standard reference disks in concrete in depression in outcropping bedrock, note 12 (b), were established. No. 1 is 9.750 meters (31.99 feet) from station in azimuth $243^{\circ}02'$. No. 2, very near and probably identical with old cross mentioned above, is 4.218 meters (13.84 feet) from station in azimuth $339^{\circ}47'$. In 1934 an azimuth mark, standard reference disk in concrete, note 11 (a), was established, 22.0 feet east of center line of main road, and about 2 miles from station in azimuth $263^{\circ}17'22''$. Elevation of station, 2,068.7 meters (6,787 feet).

Supplementary points

Cisco astronomic station (U.S.G.S.) (Eastland County, U.S.G.S., 1889; W. Bowie, 1908).—At Cisco, on a hill near the intersection of Fourth Street and Avenue F, 17.71 meters (58.1 feet) north and 4.94 meters (16.2 feet) west of

a well hole cased with iron tubing to a depth of 1,500 feet. Marked by a brick pier, 2 by 2½ bricks cross section, and 3 feet high, resting on a foundation of concrete, and capped by a dressed stone 6 by 19 by 24 inches in size. Elevation of station, 511.5 meters (1,678 feet).

Lacasa latitude station (Stephens County, E. Smith, 1912).—Distant 2.71 meters (8.9 feet) east and 0.012 meter (0.04 foot) south of station *Lacasa* (see description thereof). Marked by a wooden tripod.

Baird latitude station (Callahan County, E. Smith, 1912).—In the courthouse grounds at Baird, 33.5 meters (110 feet) west and 13.4 meters (44 feet) north of station *Baird courthouse dome*. Station is in a meridian line established at request of local authorities, and is 29.1 meters (95 feet) from the south stone, and 40.7 meters (134 feet) from the north stone of that meridian. Marking not reported.

Abilene standpipe (U.S.G.S.) (Taylor County, W. Bowie, 1908).—The older and taller of the two standpipes at Abilene and on the west side of the town.

Sears latitude station (Jones County, E. Smith, 1912).—Distant 2.325 meters (7.63 feet) west and 0.080 meter (0.26 foot) north of station *Sears* (see description thereof). Marking not recorded.

Wasp (U.S.G.S.) (Fisher County, W. Bowie, 1908).—This station is practically identical with the United States Geological Survey station of the same name, the stone mark of which was found lying on top of the ground. It is 7 miles direct, or 7½ miles by road, north by west from Sweetwater, a town on the Texas & Pacific Railway, 1 mile west of the Sweetwater-White Flat public road and 150 meters (492 feet) east of the Sweetwater-Clantonville public road, on the highest point of the highest and most prominent peak in the vicinity. The peak has an easy slope on the west side and a steep bluff on the east side. It is in a pasture owned by Joe Nunn. Station marked on surface with large nail note 21 (b), and underground by large spike note 8 (d). Elevation of station, 719.1 meters (2,359 feet).

Bynum latitude station (Mitchell County, E. Smith, 1912).—Distant 1.945 meters (6.38 feet) west and 0.08 meter (0.3 foot) north of station *Bynum* (see description thereof). Marking not recorded.

Stanton longitude station (Martin County, E. Smith, 1911; 1932).—Directly south 2.26 meters (7.4 feet) from station *Stanton* (see description thereof). The station is marked by a standard disk station mark in the top of a concrete pier 18 by 34 inches and 31 inches high. The words "Astronomical Station" are stamped on the disk in addition to the regular inscription. Recovered in 1932 in poor condition.

Barstow latitude station (Ward County, C. V. Hodgson, 1914).—Distant 33.17 meters (108.8 feet) in azimuth 268°24' from station *Barstow courthouse cupola*. Marking not reported.

Newman (U.S.G.S.) (Jeff Davis County, J. S. Hill, 1909).—Marked but not described point, 361.0 meters (1,184 feet) in azimuth 55°40'03" from station *Newman* (see description thereof). Elevation of station, 1,951 meters (6,401 feet).

West (Culberson County, C. V. Hodgson, 1911; 1931).—About 200 meters (656 feet) from the western end of the first high ridge north of Boracho, a town on the Texas & Pacific Railway. As seen from station *Boracho* (see description thereof), the station is directly in line with a large bush showing against the sky line about 300 meters (984 feet) east of station *Krouse* (see description thereof). The station is marked by a cross one-half inch deep cut in the top of a rock 3 feet in diameter, the top of which is flush with the surface of the ground. Station recovered as described, in 1931.

East (Culberson County, C. V. Hodgson, 1911).—On a small mesa-topped hill at the middle and highest part of a long ridge extending east-and-west about 6 miles north of Boracho, a town on the Texas & Pacific Railway. The top of the hill is about 30 meters (98 feet) north and south by 50 meters (164 feet) east and west, and the highest part is at the northwest ridge, about 20 meters (66 feet) N. 70° W. from the station. The station is marked by a cross, the western one of two crosses, cut in the top of a flat rock, which is about 2 feet in diameter and flush with the surface of the ground. A small conspicuous yellow knoll on an adjoining ridge bears N. 5° E. from the station and Boracho bears S. 3°30' W.

Boracho (Culberson County, C. V. Hodgson, 1911; 1931).—Due north of *Boracho longitude station* (see description thereof) and 6.565 meters (21.54 feet) distant.

For notes in regard to marking of stations see p. 154.

The station is marked by a cross on the top of a stone post, 6 by 8 by 20 inches, which projects 1 inch above the ground. Bench mark F 17 (elevation 4,458.311 feet), a stone post, 6 inches square on top, with a square hole at the center one-half inch deep, surrounded by the letters "U.S.B.M.", is on the south side of the track directly opposite the section house and 152.34 meters (499.8 feet) from the station, in azimuth $235^{\circ}05'$. The south end of the roof of the Boracho store and post office is 122.74 meters (402.7 feet) from the station, in azimuth $262^{\circ}27'$, and the west end of the roof of the section house is in azimuth $224^{\circ}45'$. The southeast corner of a large adobe corral is about 48 meters (157 feet) N. 40° E. from the station.

Boracho longitude station (Culberson County, C. V. Hodgson, 1911; 1914).—About 100 meters (328 feet) south of the Texas & Pacific Railway track and 200 meters (656 feet) southwest of the new section house at Boracho. A concrete pier was built at the station, 14 by 26 inches in cross section, with a notch in the top to give room for the reversing apparatus of the transit. The station is marked by a standard disk station mark set in the notch of the concrete pier. The station mark used has the words "Astronomical Station" stamped on the disk in addition to the regular inscription. In 1931 it was reported that station mark (pier) was found broken and overturned.

Krouse (U.S.G.S.) cairn (Culberson County, J. S. Hill, 1909).—A cairn distant 4.16 meters (13.6 feet) in azimuth $68^{\circ}42'$ from station *Krouse* (see description thereof).

Diablo (U.S.G.S.) cairn (Hudspeth County, J. S. Hill, 1909).—A cairn distant 3.23 meters (10.8 feet) in azimuth $256^{\circ}34'$ from station *Diablo* (see description thereof).

Allamore latitude station (El Paso County, C. V. Hodgson, 1914).—Distant 13.32 meters (43.7 feet) in azimuth $231^{\circ}31'$ from station *Allamore* (see description thereof). Marking not recorded.

Allamore (Hudspeth County, J. S. Hill, 1909; 1931).—Near a water tank on the north side of the Texas & Pacific Railway track about 2 miles west of the Allamore section house. Station was marked by a cap station mark screwed to top of 3-inch iron pipe, note 23. The center of the water tank is 8.79 meters (28.8 feet) from the station, in azimuth $338^{\circ}11'$. The north rail of the track is 12.49 meters (41.0 feet) south of the station, and the railway fence line is 1.56 meters (5.1 feet) north.

Quitman (U.S.G.S.) cairn (Hudspeth County, J. S. Hill, 1909).—A cairn 2.0 meters (7 feet) in azimuth $210^{\circ}58'$ from station *Quitman* (see description thereof).

Corduna (U.S.G.S.) cairn (Otero County, N. Mex., J. S. Hill, 1909).—A cairn 7.8 meters (26 feet) in azimuth $170^{\circ}48'$ from station *Corduna* (see description thereof).

Cerro Alto (U.S.G.S.) (Hudspeth County, J. S. Hill, 1909).—A cairn 7.0 meters (23 feet) in azimuth $158^{\circ}50'$ from station *Cerro Alto* (see description thereof).

Mesa (El Paso County, J. S. Hill, 1909; 1931).—About 9 miles in a direct line, east from the post office in El Paso, 5 miles, north from Ysleta, a town on the Southern Pacific, and on a long narrow point extending south on the south side of the mesa. This point is the most southern point of the mesa in the vicinity and quite prominent on account of its steep high bluffs on the east, south, and west sides. Station marked by standard disk station mark in bedrock, note 2. The reference mark, a cross cut in a rock near the edge of the bluff, is 15.53 meters (51.0 feet) from the station in azimuth $327^{\circ}32'$. In 1931 the station was visited, drill hole found, but no disk. In 1934 station not found. Elevation of station 1,213.5 meters (3,981 feet).

United States and Mexico boundary monument no. 2 eccentric (Chihuahua, Mexico, J. S. Hill, 1909).—About 3 miles west of El Paso, on top of first high ridge west of Rio Grande, and 9.75 meters (32.0 feet) in azimuth $329^{\circ}52'$ from *United States and Mexico boundary monument no. 2* (see description thereof). Mark is standard disk station mark in bedrock, note 2. Large smelter stack is distant about 1 mile from station in azimuth $294^{\circ}08'42''$.

United States and Mexico boundary monument no. 3 (United States and Mexico, United States and Mexico Boundary Commissions, 1855 and 1893; J. S. Hill, 1909).—On boundary line between United States and Mexico, about 5 miles west of El Paso, and about 0.5 mile south-southwest of Anapra siding on east rim of mesa. Mark is concrete obelisk 12 feet high on base 4 feet square. Elevation of top of masonry base 1,258 meters (4,127 feet).

United States and Mexico boundary monument no. 2 (United States and Mexico, United States and Mexico Boundary Commissions, 1855 and 1893; J. S. Hill, 1909).—On boundary line between United States and Mexico, on top of first high ridge west of Rio Grande. Mark is an obelisk of concrete 4 feet square at base and 12 feet high. Elevation of top of masonry base 1,307.64 meters (4,290.1 feet).

El Paso, Federal building, center of tower (El Paso County, J. S. Hill, 1909; 1911).—Center of tower of Federal building in El Paso.

El Paso, Federal building flagstaff (El Paso County, J. S. Hill, 1909).—Flagstaff on Federal building in El Paso.

El Paso astronomic station no. 1 (El Paso County, United States and Mexico Boundary Commission, 1893).—One of the United States and Mexico Boundary Commission stations. It is on a sand plain on east side of the Rio Grande between the river and the Atchison, Topeka & Santa Fe Railway. Marked by lead plug in top of boulder weighing about 250 pounds buried with its top about 3 inches below surface of sand. A notch was made on near rail of railroad directly in line with *United States and Mexico boundary monument no. 1* and *United States and Mexico boundary monument no. 2*. This notch is 38.68 meters (126.9 feet) from station.

United States and Mexico boundary monument no. 1 (New Mexico-Mexico, 1893).—On the west bank of the Rio Grande and 172.6 meters (566 feet) from the center of the channel. It is a cut stone monument 12 feet high, 5 feet square at the base, and 2½ feet square at the top, with a jacket of concrete 4 feet high around the base.

El Paso magnetic station "Boundary" (El Paso County, C. H. Sinclair, 1892).—On east side of Rio Grande, on land between Atchison, Topeka & Santa Fe Railway and Southern Pacific Railroad, and also in prolongation of boundary line. Marking unknown.

Weather (El Paso County, C. V. Hodgson, 1911).—The iron pole at the center of the small house over the elevator shaft on top of the new El Paso & Southwestern Railroad Co.'s building at El Paso. The pole is used by the United States Weather Bureau and bears their aerometer at the top.

Mills (El Paso County, C. V. Hodgson, 1911).—The tall iron flagstaff on top of the new Mills Building, in the downtown section of El Paso and opposite the post office and Plaza. The station is near the northeast edge of the house over the elevator shaft and at the top of the flight of steps leading to the top of this house.

El Paso Presbyterian Church (El Paso County, C. V. Hodgson, 1911).—The wooden finial surmounting the square bell tower over the southeast or main entrance of the brick Presbyterian Church at the corner of Stanton and Boulevard Streets, El Paso.

El Paso longitude station (1911) (El Paso County, C. V. Hodgson, 1911).—It was found in 1911 that the old longitude station of 1892 had been destroyed and so a new station was established. It is in the western corner of Cleveland Park and about 30 meters (98 feet) west of the new concrete band stand. The station is marked by a concrete pier 18 by 34 inches in cross section with its foundation 3 feet in the ground. Longitude station is 2.275 meters (7.46 feet) due south of triangulation station *West* (see description thereof).

El Paso longitude station (1892) (El Paso County, C. H. Sinclair, 1892; 1899).—In the United States military reservation, now Cleveland Park, about 250 meters nearly due west from the plaza of El Paso, in the block bounded by Missouri, Santa Fe, El Paso, and Franklin Streets. The station is now lost. A new longitude station was established in 1911 in same part of square, and called *El Paso longitude station (1911)* (see description thereof).

El Paso latitude station (El Paso County, C. H. Sinclair, 1892).—Due west 1.28 meters (4.2 feet) from *El Paso longitude station (1892)* (see description thereof). Station is now lost.

Wheeler's latitude and longitude station (1878) (El Paso County, C. H. Sinclair, 1892).—In 1892 a stone in plaza, flush with surface, west of fountain, and supposed to be Wheeler's station of 1878, was 246.1 meters (807 feet) or 9/35 of longitude east and 31.8 meters (104 feet) or 1".03 of latitude south of *El Paso longitude station (1892)* (see description thereof). Station now lost.

Jarilla latitude and longitude station (Otero County, N. Mex., E. Smith, 1911, C. V. Hodgson, 1914).—Distant 2.5 meters (8 feet) east and 0.38 meter (1.2 feet) south from station *Jarilla* (see description thereof). Marked by a standard disk station mark, with additional words "Astronomical Station" stamped thereon,

set in top of concrete pier 14 by 26 inches in cross section, and 35 inches high above the solid rock on which it stands.

North Franklin (U.S.G.S.) cairn (El Paso County, N.Mex., J. S. Hill, 1909).—A cairn 2.9 meters (10 feet) in azimuth $174^{\circ}05'$ from station *North Franklin* (see description thereof).

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC

Principal points

Jurnegan (Eddy County, N.Mex., C. M. Durgin, 1922).—About 18 miles southwest of Carlsbad, 16 miles west of Malaga, 6 miles west of the schoolhouse at Johnson's ranch on the Black River, and $2\frac{1}{2}$ miles southwest from Ed. Junkins' goat ranch at the Jurnegan springs. To reach station follow up the canyon from the goat ranch by the Jurnegan springs, climb ridge to the south, and follow along it to highest point. Station marked by standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12 (a). No. 1 is 28.70 meters (94.16 feet) from station, in azimuth $250^{\circ}14'$; No. 2, 13.655 meters (44.80 feet), $3^{\circ}13'$. Elevation of station, 1,295.2 meters (4,249 feet).

Loving (Eddy County, N.Mex., C. M. Durgin, 1922).—About $1\frac{3}{4}$ miles southwest from the depot at Loving, $3\frac{1}{2}$ miles northwest from the depot at Malaga, in the big bend of the main canal, on the highest point of the eastern and highest of the two prominent knolls in the NW. $\frac{1}{4}$ sec. —, T. 23 S., R. 28 E., around the eastern end of which the canal leads. Station mark is a standard disk station mark in outcropping bedrock, note 2 (a). Reference marks are standard reference disks in outcropping bedrock, note 12 (a). No. 1 is 13.91 meters (45.64 feet) from station, in azimuth $18^{\circ}50'$; No. 2, 37.81 meters (124.05 feet), $108^{\circ}30'$. Elevation of station, 964.0 meters (3,163 feet).

Screwbean (Culberson County, C. M. Durgin, 1922; 1931).—Eleven miles south of the Texas-New Mexico State line, $4\frac{1}{2}$ miles south from the Reynolds ford on the Delaware Creek, which ford is 14 miles due west from Angeles, a station on the Pecos River branch of the Atchison, Topeka & Santa Fe Railway, 5 miles west from the Alexander ranch at Screwbean Springs, three-fourths mile north of the road leading from Screwbean Springs through the gap to Delaware Creek, on the highest point of the Screwbean Hills, and one-half mile northeast of a cairn on a prominent hill just north of the road in the gap. Station marked by a standard disk station mark in a flat stone, 18 by 36 inches, flush with ground, note 2. Two reference marks were set, standard reference disks in bedrock, note 12 (a); No. 1 is 28.630 meters (93.93 feet) from station in azimuth $288^{\circ}51'$. No. 2 is 9.195 meters (30.17 feet) from station, in azimuth $54^{\circ}32'$. Elevation of station, 1,116.5 meters (3,663 feet).

Pope (Eddy County, N.Mex., C. M. Durgin, 1922).—About 3 miles north of the Texas-New Mexico State Line, 12 miles northeast of Angeles, 6 miles east of the Pecos River, 7 miles east of station Corral on the Atchison, Topeka & Santa Fe Railway, and on the highest point of a large mesa, 40 meters (131 feet) from the sheer south side of the mesa. Station reached by crossing the river at Popes Crossing 2 miles north of the State line opposite Corral and following main wagon road 6 miles, when the station will be 1 mile to south. Station mark is standard disk station mark in outcropping bedrock, note 2. Reference mark is standard reference disk in outcropping bedrock, note 12 (a), 32.55 meters (106.8 feet) from station, in azimuth $14^{\circ}56'30''$. Elevation of station, 948.6 meters (3,112 feet).

Welch (Eddy County, N.Mex., C. M. Durgin, 1922).—About 4 miles north of the State line, $1\frac{1}{2}$ miles northwest from the ranch house of J. H. Welch, 1 mile southeast from Crowder's house, 4 miles west from Coad brothers' ranch house, at the western end of a range of hills, on the highest point of the western ridge running east and west. To the west the hill drops off abruptly. Station marked by a standard disk station mark in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12 (a). No. 1 is 23.76 meters (77.95 feet) from station, in azimuth $271^{\circ}00'$; No. 2, 47.15 meters (154.69 feet), $4^{\circ}46'$. Elevation of station, 1,040.0 meters (3,412 feet).

Devine (Reeves County, C. M. Durgin, 1922; 1931).—Seven miles northwest of Arno, 10 miles southeast of Orla, 1 mile south and west of the Pecos River branch of the Atchison, Topeka & Santa Fe Railway, 3 miles southeast of the

Fistail ranch, on the northwest hump of a double hill. Station reached from Arno by following the railroad north until opposite the station, then turning to the west across country. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 32.86 meters (107.8 feet) from station, in azimuth $153^{\circ}39'$. Elevation of station, 868.8 meters (2,850 feet).

Snyder (Reeves County, C. M. Durgin, 1922; 1931).—Eighteen miles northwest of Toyah, 19 miles south of Orla, 4 miles northwest from the ranch house of Joe Macavane, 4 miles S. 16° W. of the H. T. Snyder ranch house and two windmills, 2 miles N. 84° W. from the Fred Snyder ranch house and windmill, 1 mile N. 49° W. from a prominent round-topped hill on which is an Indian grave, and on top of a flat-topped hill. Reached from the Fred Snyder place by going west around the round-topped hill along a slightly used road until the first hill to the right or north is seen about three-fourths mile away. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 20.515 meters (67.31 feet) from station in azimuth $91^{\circ}23'$. Elevation of station, 1,013.5 meters (3,325 feet).

Ross (Reeves County, C. M. Durgin, 1922; 1931).—About 12 miles south of Orla, 12 miles southeast of Screwbean Springs, 3 miles east of the Incline well and cottonwoods which are 1 mile north of the Incline ranch, 1 mile southeast of the old Charlie Ross place, on the highest point on the eastern spur of the hill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 18.985 meters (62.29 feet) from station, in azimuth $331^{\circ}44'$. The azimuth of the Toyah Valley Sulphur Company's mine is $81^{\circ}52'$. Elevation of station, 972.8 meters (3,192 feet).

Carruthers (Reeves County, C. M. Durgin, 1922; 1931).—Seventeen miles northwest of Toyah, 19 miles south of Orla, 28 miles northwest of Pecos, 1.3 miles north of the Fred Snyder ranch, on highest point of small flat-topped hill. To reach from the Fred Snyder ranch go out north gate and follow dim road about three-fourth mile, then turn right across country one-half mile to station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 20.49 meters (67.2 feet) from station in azimuth $158^{\circ}26'$. Elevation of station, 970.1 meters (3,183 feet).

Supplementary points

Mile corner 53 eccentric (Loving County, C. M. Durgin, 1922; 1931).—Seven miles northeast of Angeles, Tex., 1 mile east of Pecos River, $1\frac{1}{2}$ miles northwest of the Cascade ranch house belonging to Cowder brothers, on highest point of prominent hill on south side of saddle in which *Mile corner 53* stands. Station marked by standard disk station mark in outcropping bedrock, note 2. Reference mark is standard reference disk in outcropping bedrock, note 12 (a), 25.36 meters (83.2 feet) from station, in azimuth $300^{\circ}46'$. *Mile corner 53* (see description thereof) is 471.174 meters (1,545.84 feet) from the station in azimuth $204^{\circ}45'56''$. Elevation of station, 892.0 meters (2,926 feet).

Mile corner 61 eccentric (Culberson County, C. M. Durgin, 1922).—About 7 miles northwest of Angeles, Tex., about 1,000 meters (3,280 feet) west of Delaware Creek, $1\frac{1}{4}$ miles southwest of old Coad Dam, and on eastern spur of hills. Station marked by 1-inch hole drilled in rock. *Mile corner 61* (see description thereof) is 562.58 meters (1,845.7 feet) from station in azimuth $238^{\circ}31'51''$. Elevation of station, 950.5 meters (3,118 feet).

Mile corner 53 (Loving County, Tex.—Eddy County, N. Mex., C. M. Durgin, 1922).—Seven miles northeast of Angeles, on an undulating ridge which bears north and south, 10.00 chains (660 feet) east of beginning of descent to the Pecos River, 58.40 chains (3,854 feet) east of the Pecos River, 65.81 chains (4,343 feet) N. $89^{\circ}58'30''$ E., east of Pecos Monument (Clark Monument No. 25), approximately 12.50 chains (825 feet) west of southeast corner of fractional sec. 34, T. 26 S., R. 29 E., New Mexico principal meridian, and 471.174 meters (1,545.84 feet) in azimuth $204^{\circ}45'56''$ from station *Mile corner 53 eccentric* (see description thereof). Mark is a 3-inch iron pipe, 36 inches long, filled with concrete, flanged at bottom, set 26 inches in ground, and surmounted by brass cap inscribed "New Mexico-Texas Clark Boundary 1859. Mile Corner No. 53. General Land Office Reestablishment, 1911, United States Boundary Commission."

Mile corner 61 (Culberson County, Tex.—Eddy County, N. Mex., C. M. Durgin, 1922).—About 7 miles northwest of Angeles, on rolling ground, 19.84 chains (1,309 feet) west of southeast corner of fractional sec. 32, T. 26 S., R. 28 E., New Mexico principal meridian, and 562.58 meters (1,845.7 feet) in azimuth $238^{\circ}31'51''$ from station *Mile corner 61 eccentric* (see description thereof). Clark Monument No. 22 bears $S. 89^{\circ}56' E.$, distant 21.955 chains (1,449 feet). Marked by 3-inch iron pipe, 36 inches long, filled with concrete, flanged at bottom, set 23 inches in ground, and surmounted by brass cap inscribed "New Mexico-Texas Clark Boundary, 1859, Mile Corner No. 61 General Land Office Reestablishment, 1911, United States Boundary Commission." A mound of stone with 3-foot base, $2\frac{1}{2}$ feet high, is east of corner.

RIO GRANDE ARC

Principal points

Handy (Hidalgo County, C. V. Hodgson, 1917).—About 6 miles south and 3 miles west of Donna, 3 miles west of the point where the road running south from Donna along the east side of the Donna sugar mill joins the military road and 1.8 miles west of the point where the Donna Canal crosses the military road. The station is about 40 meters (131 feet) south of the military road and three telephone poles east of the point where the military road changes direction from west to southwest. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is iron nail in concrete block, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 35.51 meters (116.5 feet) from station in azimuth $213^{\circ}10'$. Elevation of station, 26.8 meters (88 feet).

San Juan (Hidalgo County, C. V. Hodgson, 1917; 1927).—About 3.6 miles west and 0.6 mile north of Donna, on the west side of a newly opened road which leaves the Donna-Mission road 3.6 miles west of Donna, and 0.6 mile north of the St. Louis, Brownsville & Mexico Railway, on a small sand ridge, 15 paces south of the first canal which crosses what is known as Tower Road, 0.5 mile east and 0.5 mile north of the town of Alamo. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete block, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), set in the fence line along the road on the side nearest the station, 29.80 meters (97.8 feet) from station in azimuth $17^{\circ}32'$.

In 1927 the station mark was recovered in poor condition; the ground around the mark had been dug out and removed, leaving the mark projecting 10 inches above the ground. The reference mark had evidently been covered over or dug up in building the canal. Station mark is identical with B. M. Y 59, elevation 103.087 feet; reference mark with B. M. Z 59, elevation 101.312 feet.

Hickley (Hidalgo County, C. V. Hodgson, 1917).—About 4 miles south and 2 miles west of McAllen, on the farm of J. J. Hackney, about 60 or 70 meters (197 or 230 feet) northwest of his house, 30 meters (98 feet) northwest of a concrete water tank, 38 meters (125 feet) east of the east fence line along the lane leading south to Mr. Hackney's house, and 25 meters (82 feet) north of his feed-lot fence. It is best found by going south from the old railroad depot at McAllen for 4 miles, west 1 mile, and then south one-half mile to Mr. Hackney's house. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 31.23 meters (102.5 feet) from station in azimuth $92^{\circ}54'$. Elevation of station, 32.1 meters (105 feet).

McAllen (Hidalgo County, C. V. Hodgson, 1917).—Two miles north of McAllen, on the east side of the main wagon road, in a small field owned by T. H. Cromwell, 1343 D Street, Lincoln, Nebr., and rented by P. R. Rice. Station is 48 meters (157 feet) southwest of the southwest corner of Mr. Rice's residence. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is iron nail in concrete block, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), set at the southwest corner of the house, 48.325 meters (158.55 feet) from station in azimuth $218^{\circ}53'$. Elevation of station, 37.1 meters (122 feet).

Mamie (Hidalgo County, C. V. Hodgson, 1917; 1927).—About 4 miles west of Mission, 1 mile west of the Mamie railroad siding, and 0.4 mile south of the railroad. A wagon road, which crosses the railroad 1 mile west of Mamie, runs south and then southwest 0.8 mile to a point where it intersects with a north-and-south road, which is cleared through the brush, but which is ungraded and untraveled. The station is 12 meters (39 feet) east of this intersection. Surface

mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 28.66 meters (94.0 feet) from station in azimuth $10^{\circ}38'$. In 1927 station and reference marks recovered as described. Station mark is identical with B.M. E 60, elevation 141.627 feet; reference mark with B.M. F 60, elevation 141.197 feet.

Mission (Hidalgo County, C. V. Hodgson, 1917).—About $5\frac{1}{2}$ miles northwest by north from the town of Mission, on a ranch owned by Alfredo Flores, about 0.3 mile east by south from the ranch house and the same distance southeast by east from the windmill and tank at the ranch and about 10 meters (33 feet) south of the wagon trail leading eastward from the ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 30.13 meters (98.9 feet) from station in azimuth $191^{\circ}21'$. To reach station take road which leads north from the Mission-Riogrande wagon road at a point about 1 mile west of Mamie railway station, following it 5.7 miles to ranch house, and thence 0.3 mile eastward to station. Elevation of station, 53.7 meters (176 feet).

Pedro (Hidalgo County, C. V. Hodgson, 1917; 1927).—About 3 miles east of Samfordyce, 1 mile north of the Mission-Riogrande wagon road, on the hill at the north edge of the Mexican village of Tabasco, and at the north end of a small unfenced cemetery, 21 meters (69 feet) east of the center of the main wagon road running north from the village, 14 meters (46 feet) north and 2 meters (7 feet) east of the monument marking the grave of Ignacio Trevino. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 17.77 meters (58.3 feet) from station in azimuth $107^{\circ}51'$. In 1927 the station was recovered as described. Surface mark is identical with B.M. J 60, elevation 171.725 feet; reference mark with B.M. K 60, elevation 171.824 feet.

Palo (Hidalgo County, C. V. Hodgson, 1917).—About $6\frac{1}{2}$ miles north of the St. Louis, Brownsville & Mexico Railway, 7 miles north by west from Penitas, and $2\frac{1}{2}$ miles northwest from Palo Blanco ranch, near a new frame house and windmill on a goat ranch. It is best found by going three-fourths mile northwest from the Palo Blanco ranch, then 2 miles north and one-half mile west to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), set at the northwest corner of the new frame house mentioned above, 49.26 meters (161.6 feet) from station in azimuth $0^{\circ}36'$. Elevation of station, 72.5 meters (238 feet).

Fordyce (Starr County, C. V. Hodgson, 1917).—About $3\frac{1}{2}$ miles west and 3 miles north of Samfordyce, 2 miles north of the military wagon road, 1 mile north of the point where the road from Samfordyce to El Toro ranch changes from a northwest to a north course, and 5 meters (16 feet) east of the middle of the present track, and 4.8 miles south of the El Toro ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.17 meters (46.5 feet) from station in azimuth $99^{\circ}11'$. Elevation of station, 71.8 meters (236 feet).

Eltoro (Starr County, C. V. Hodgson, 1917).—About $8\frac{1}{2}$ miles northwest of Samfordyce, 7 miles north of the military wagon road, 4.65 miles north of Fordyce, and 0.3 mile west of the El Toro ranch, on the east side of the main wagon road running north past the El Toro ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 46.79 meters (153.5 feet) from station in azimuth $8^{\circ}29'$. Elevation of station, 94.7 meters (311 feet).

Garcia (Starr County, C. V. Hodgson, 1917).—About 2 miles north-northwest of Garcias post office, 2 miles north of the military wagon road, about one-half mile south of a cleared field with a large, lone mesquite tree in the center, 20 meters (66 feet) east of a wire fence, and 17 meters (56 feet) west of the center of a ranch road which leaves the military road 0.7 mile west of Garcias post office at the southwest corner of some cleared fields and runs north. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 19.19 meters (63.0 feet) from station in azimuth $189^{\circ}08'$. In 1932 reported that station (surface?) and reference marks plowed up and were lying

loose in the field. Station site reached in 1932 by going west on Highway No. 4, 1.75 miles from main road leading south to Garciasville; thence on trail to north at east edge of hill 0.42 mile to southwest corner of field; thence east along south edge of field 0.54 mile to station site. Azimuth from station to Riogrande standpipe is $107^{\circ}36'09''$. Elevation of station, 72.6 meters (238 feet).

Pancho (Starr County, C. V. Hodgson, 1917).—About 7 miles direct and 9 miles by road north of Garcias post office, just east of the ranch house on the northeast ranch of Pancho Lopez. There is a windmill 106 meters (348 feet) from the station in azimuth $126^{\circ}44'18''$. The line from the station to the windmill passes midway between two small sheds, the northern one with a shingle roof and the southern thatched. The northeast corner of the southern shed is about 58 meters (190 feet) distant. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk, note 11 (a), set just west of a brush corral, 37.13 meters (121.8 feet) from station in azimuth $237^{\circ}58'$. Elevation of station, 113.2 meters (371 feet).

Monument (Starr County, C. V. Hodgson, 1917).—About 3 miles southeast by east of Riogrande on a rocky point of the terrace or beach, 150 meters (492 feet) north of the military road. A brick monument, easily visible from the road, is 12.9 meters (42.3 feet) from the station in azimuth $124^{\circ}26'38''$. *United States and Mexico boundary monument, R.P. no. 4* (see description thereof) a few meters north of the road, is 150.58 meters (494.0 feet) from the station in azimuth $82^{\circ}57'03''$. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11.76 meters (38.6 feet) from station in azimuth $228^{\circ}37'$. Elevation of station, 74.4 meters (244 feet).

Corpus (Starr County, C. V. Hodgson, 1917).—About 5.5 miles north-northeast of Riogrande, 150 meters (492 feet) west of the Riogrande-Corpus Christi wagon road, and one-fourth mile south-southwest of a Mexican ranch house in a small basinlike depression. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 17.54 meters (57.5 feet) from station in azimuth $216^{\circ}36'$. In 1932 reported that station and reference marks had been destroyed. Elevation of station, 101.7 meters (334 feet).

Grande (Starr County, C. V. Hodgson, 1917).—On a hill 1 mile northwest of the post office at Riogrande. It is best found by taking the road up the hill past the cemetery at Riogrande. The station is about 10 meters (33 feet) south of the road with the steeple of the Methodist church in line with the southwest corner of the large school building at Riogrande. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 9.44 meters (31.0 feet) from station in azimuth $309^{\circ}04'$. Elevation of station, 81.5 meters (267 feet).

Hebron (Starr County, C. V. Hodgson, 1917).—About $6\frac{1}{2}$ miles northwest of Riogrande, on the highest of a group of brush-covered hills. Best found by going west on the military road $5\frac{1}{2}$ miles from Riogrande, then north on a road along the east side of a wire fence for 4.4 miles to the point where the road passes over the ridge. The station is on this ridge about one-fourth mile to the eastward and north, and about 10 meters (33 feet) south of the beginning of the short steep slope to the north. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.045 meters (42.80 feet) from station in azimuth $241^{\circ}43'$. Elevation of station, 116.9 meters (384 feet).

Ringgold (Starr County, C. V. Hodgson, 1917; 1932).—About 5 miles west of Riogrande, one-third mile south of the military wagon road and $\frac{1}{2}$ miles (15 feet) west of the east fence of a wide road leading from the military road to the river. The southeast corner of a Mexican hut is 72 meters (236 feet) from the station in azimuth $151^{\circ}13'$. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 30.740 meters (100.85 feet) from the station in azimuth $95^{\circ}56'$. In 1927 the station was recovered; the disk had been removed from the concrete. Reference mark not found. In 1932 reported that station mark had been destroyed by road grading. Reference mark recovered in west fence line of road. Elevation of station, 53.93 meters (176.9 feet).

Garcena (Starr County, C. L. Garner, 1917).—On the highest part of a ridge about 9 miles west-northwest from Riogrande, 7 miles northeast of Roma, and 3 miles north of a military wagon road leading west from Riogrande. To reach the station, take the road leading north through a lane just east of a small frame house with red picket fence about 1 mile west of a Mexican settlement, with small store; about one-half mile from the military road take the left fork; and one-half mile farther the left fork again; proceed to a fenced, uncultivated lot about 3 miles from the military road; and follow the ridge to the right one-half mile to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 15.935 meters (52.28 feet) from station in azimuth 249°06'. Elevation of station, 120.6 meters (396 feet).

Gorgora (Starr County, C. L. Garner, 1917; 1933).—About 1¼ miles from Roma and 400 meters (1,312 feet) from an old road leading northeast from Roma. To reach the station, enter a field near a barn on the east side of town and follow the road across the south end of the field about one-half mile to the pasture and then to the top of the ridge. A reddish knob 1¼ miles northeast from town will be seen from the entrance to the field. The station is on the top of the first knob beyond this and about one-third mile distant. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.615 meters (41.39 feet) from the station in azimuth 175°54'. In 1933 station and reference marks were recovered in good condition. Elevation of station, 100.8 meters (331 feet).

Roma (Starr County, C. L. Garner, 1917; 1933).—On the top of a flat ridge 4½ miles north of Roma, three-fourths mile north of the point where the military road for Zapata forks to the left, 14 meters (46 feet) east of the Roma-Hebronville wagon road and 4 meters (13 feet) east of the east fence along this road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.52 meters (44.4 feet) from station in azimuth 9°14'. In 1933 station and reference marks were recovered in good condition. Elevation of station, 132.2 meters (434 feet).

Chinges (Starr County, C. L. Garner, 1917).—On top of a flat hill, one-half mile south of Sanchez ranch and one-third mile west of the wagon road leading from the oil wells in this vicinity to Riogrande via the Riogrande-Hebronville road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 23.99 meters (78.7 feet) from station in azimuth 235°25'. Station reached from Roma via Roma-Hebronville road 11 miles to gate; go through gate and turn in road to east; following this road about 5 miles, keeping to right, and passing through 3 gates to stock pens and dirt tank 200 meters (656 feet) west of road. Before reaching stock pens road goes about south; station is on top of hill south of pens. Elevation of station, 143.8 meters (472 feet).

Margo (Starr County, C. L. Garner, 1917; 1928).—On a flat-topped hill, the highest point in the vicinity, about 10 miles north of Roma, one-half mile west of the Roma-Hebronville wagon road. To reach the station, take the new road which turns to the northwest from the Roma-Hebronville road about 200 meters (656 feet) south of a sharp turn to the east around a fence and Mexican house; follow the new road one-half mile to a point where the brush on the west side of the road is very scattering; turn to the left and follow ridge to the top, one-fourth mile distant. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 15.90 meters (52.2 feet) from station in azimuth 69°00'. In 1928 reported that reference mark had been destroyed and disk removed from concrete, but station otherwise in good condition. Elevation of station, 152.1 meters (499 feet).

Banchez (Starr County, C. L. Garner, 1917).—On the top of a flat hill, one-eighth mile east of the Riogrande-Hebronville road and about one-half mile northeast of some stock pens, referred to in description of station *Chinges*. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.795 meters (45.26 feet) from station in azimuth 307°48'. Elevation of station, 139.3 meters (457 feet).

Labra (Starr County, C. L. Garner, 1917; 1927).—About 16 miles northwest from Roma, 100 meters (328 feet) east of the Riogrande-Laredo military road,

at a point where there is a wire fence on each side of the road, and about 200 meters (656 feet) east of board gates, painted pink, on each side of the road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.057 meters (33.00 feet) from station in azimuth $190^{\circ}48'$. In 1927 surface mark recovered as described. It is identical with B.M. C 62, and is stamped "Labra 1917 Elev. 397.98 Ft." Reference mark (B.M. B 62) reported destroyed. Elevation of station, 121.30 meters (398.0 feet).

Burros (Starr County, C. L. Garner, 1917).—On the highest point of the ridge to the north of the Los Burros ranch, about 15 miles north of Roma, and 1 mile southeast of the Starr-Zapata county line. The station is best reached by following the Roma-Hebronville road about $9\frac{1}{2}$ miles from Roma to a point where the road forks; follow the left road, which is new and straight, for about 4 miles, to a point where it is crossed by a road from the southwest; cross this road and go about one-half mile to the shoulder of a hill where several roads come together. A rocky knob is just to the north. Leave the road and go to the west of the rocky knob and follow the ridge about 2 miles to the station, which is in a fairly open spot. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.99 meters (49.18 feet) from station in azimuth $152^{\circ}44'$. Elevation of station, 167.6 meters (550 feet).

Flores (Starr County, C. L. Garner, 1917).—On top of a flat ridge 50 meters (164 feet) west of a wire fence said to be on the Starr-Zapata county line. The station is best reached by going to station *Burros* (see description thereof), and following the ridge $1\frac{1}{4}$ miles to the westward. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16.700 meters (54.79 feet) from station in azimuth $238^{\circ}59'$. Elevation of station, 162.7 meters (534 feet).

Roleta (Zapata County, C. L. Garner, 1917; 1932).—About 5 miles northwest of Lopeno post office and 3 miles north of the military road. To reach the station from the eastward, follow the military road 5 miles northwest of Lopeno through a deep arroyo and over or around a steep rocky hill, one-half mile beyond which a dim road turns to the north; follow this road $2\frac{1}{2}$ miles to the top of a hill, where the station is 50 meters (164 feet) east of the road. The hill slopes downward very sharply about 500 meters (1,640 feet) north of the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.335 meters (33.91 feet) from station in azimuth $308^{\circ}47'$. In 1932 recovered in good condition. Further described as being on top of a high hill covered by dense brush and a heavy deposit of gravel, and 4,790 feet, N. $67^{\circ}38'$ E. from proposed new location of the Laredo-Roma highway. Hill known locally as "Loma Blanca". Elevation of station, 123.8 meters (406 feet).

Presa (Zapata County, C. L. Garner, 1917; 1932).—On the top of a ridge about 2 miles northeast of La Presa ranch, 10 miles northeast of Falcon post office, and one-third mile west of the road from La Presa ranch to the north. At La Presa ranch, about 100 meters (328 feet) south of the house, take the road to the east and follow about 3 miles over a very steep hill and to a point about $1\frac{1}{4}$ miles beyond the hill. The station is on top of a flat hill at the west of the road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 9.52 meters (31.2 feet) from station in azimuth $346^{\circ}10'$. In 1932 recovered in good condition. Further described as being approximately 9,000 feet east of M.P. No. 38 of the United Gas System 12-inch gas line to Roma; 1,800 feet east of wire fence running N. 35° W.; and 350 feet south of broad and very old "cendera." Elevation of station, 152.1 meters (499 feet).

Evanito (Zapata County, C. L. Garner, 1917; 1932).—In a bare place at the highest point on a ridge, 11 miles east of north from Lopeno post office, 2 miles west of Evanito ranch, 1 mile north of a road leading from Evanito ranch to the military road and 1 mile north of a shack, stock pens, and dirt tank. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.970 meters (29.43 feet) from station, in azimuth $159^{\circ}26'$. Station best reached by the military road. At about $1\frac{1}{2}$ or 2 miles north of Soledad there is a wire fence and gate with sign "Casa Vieja" and road turning north along east side of wire fence. Follow this road about 7 miles to second gate

from military road. At this point a road turns to left and follows along west side of fence, and a shack, stock pens, and dirt tank will be seen just to north and at foot of hill. Follow road along fence 1 mile to top of ridge; turn left and follow top of ridge one-fourth mile to station at highest point, in bare spot. In 1932 recovered in good condition. Further described as being on top of hill covered with dense brush, 835 feet S. 36° E. from north fence line of Evanito ranch; and 16,859 feet, S. 54° W. from the west line of El Grullo grant. Elevation of station, 149.9 meters (492 feet).

Ale (Zapata County, C. L. Garner, 1917; 1932).—About 4 miles north of the military road and 2 miles southwest of the Alehandrenas ranch. The station is best reached by following the military road about 1 mile beyond *Roleta* to a draw between two hills where the road forks; take the left fork leading to the north and follow for about $1\frac{1}{2}$ miles to the top of a ridge, where the station is in an open place on the top of the ridge, just east of the highest mesquite trees and about one-eighth mile west of the road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.815 meters (35.48 feet) from station, in azimuth $136^{\circ}22'$. In 1927 reported that station mark had been removed, but that old tripod was still standing over hole from which mark had been taken. A concrete monument 10 inches square and 2 feet long with standard Corps of Engineers brass disk was set in this hole directly under signal. Disk was marked "United States Army, Engineer, U.S.A. 'Ale.'" In 1928 the original underground mark was recovered, and also the old form in which the concrete monument had been molded. New monument (1927) was placed therein and directly over underground mark. Distance to reference mark checked 35.48 feet. In 1932 recovered in good condition. Further described as being 875 feet northwest of the Roleta-Ale Handrenas road; approximately 1,700 feet west of deep narrow arroyo; and 878 feet, N. 40° W. from curve in road which is 1,588 feet S. 50° W. from intersection of road and arroyo. The disk is marked "United States Army-Engineer U.S.A. Ft. Sam Houston, Texas." Elevation of station, 129.5 meters (425 feet).

Rafael (Zapata County, C. L. Garner, 1917; 1932).—On the highest hill in the vicinity, about 6 miles southeast of Zapata, 2 miles northwest of the Sabinito ranch, and 2 miles north of the military road, and 75 meters (246 feet) south of the upper road which branches from the military road about one-fourth mile east of the Sabinito ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11.300 meters (37.07 feet) from station, in azimuth $229^{\circ}07'$. Station reached from military road by turning into road leading to northwest, and following it for about 3 miles, through two gates, and along west side of wire fence to top of hill. Station is about 200 meters (656 feet) southeast of gate in wire fence. Station was recovered in 1928, and a line of levels run to it gave an elevation of 401.82 feet. In 1932 recovered in good condition. Further described as being on top of a very rocky knoll, 4,000 feet southwest of "porcion" line fence running northeast; and 203.3 feet west of cross fence running approximately N. 5° E. Elevation of station, 122.3 meters (401 feet).

Humaran (Zapata County, C. L. Garner, 1917; 1932).—About 10 miles east of Zapata. Best reached by leaving the military road one-fourth mile east of the Sabanito ranch, which is about 7 miles southeast of Zapata, and following the road to the north to the point where it winds westward around a flat hill grown thick with mesquite trees. The station is on the highest point of the hill about one-eighth mile east of the road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.480 meters (47.51 feet) from station, in azimuth $356^{\circ}41'$. In 1932 recovered in good condition. Further described as being 3,499 feet N. $15^{\circ}47'$ E. from junction point of road from highway along river to Cinguo de Mayo ranch, at which point is a wooden gate and a 2-inch iron pipe. Station may be reached only on foot. Elevation of station, 138.4 meters (454 feet).

Zapata (Zapata County, C. L. Garner, 1917; 1933).—About 1 mile east of the town of Zapata, 20 meters (66 feet) south of the military road, on top of the highest point in the vicinity and where the road leading northeast branches from the military road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 9.535 meters (31.28 feet) from station, in azimuth $14^{\circ}11'$. In 1927 surface mark recovered as described and stamped "Zapata

1917 Elev. 371.55 ft." Reference mark also recovered and stamped "Zapata 1917 Elev. 371.14 ft." They correspond to B.M.'s D 62 and E 62. In 1932 recovered in good condition, 12.5 feet south of south edge of road cut of military road (now State highway), at intersection of Y northeast of Aguilares. Elevation of B.M.D 62 is 371.672 feet; and of B.M.E 62, 371.629 feet.

Moleno (Zapata County, C. L. Garner, 1917).—About 6 miles north by east from Zapata. The station is best reached by taking the military road east from Zapata for about 1 mile to a fork of the road; here take the left road leading northeast for about 3 miles to two gates, take the road to the left through a lane for 2.4 miles to an old deserted ranch and field, follow the fence line leading about northeast to the top of a flat hill with large mesquite trees. The station is in an open spot on the highest part of the hill 100 meters (328 feet) west of the fence. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.21 meters (40.1 feet) from the station, in azimuth $329^{\circ}42'$. Elevation of station, 156.2 meters (512 feet).

Feora (Zapata County, C. L. Garner, 1917; 1927).—On the highest point of a flat-top ridge, 8 miles north-northwest of Zapata, and 30 meters (98 feet) south of the military road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.440 meters (40.81 feet) from station, in azimuth $339^{\circ}26'$. In 1927 station recovered as described, and surface mark stamped "Feora 1917 Elev. 455.80 ft." Reference mark also recovered and stamped "Feora 1917 Elev. 455.78 ft." They correspond to B.M.'s H 62 and I 62. Standard elevations for these marks are: H 62, 455.934 feet; I 62, 455.908 feet.

Loma (Zapata County, C. L. Garner, 1917).—About 9 miles north of Zapata, and $3\frac{1}{2}$ miles northeast of the San Maguil ranch, on top of flat ridge, in edge of mesquite trees, 250 meters (820 feet) west of wire fence leading northeast from ranch. To reach from Zapata, follow military road 6 miles to the two knobs at station *Urebeno* (see description thereof). About 300 meters (984 feet) west of knobs take road to right about 2 miles to San Maguil ranch. Go through lot, turn through gate to left, and follow road leading through lane to northeast $3\frac{1}{2}$ miles to ridge and station site. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 18.360 meters (60.24 feet) from station in azimuth $51^{\circ}56'$. Elevation of station, 152.98 meters (501.9 feet).

Urebeno (Zapata County, C. L. Garner, 1917; 1932).—Six miles north by west of Zapata and 200 meters (656 feet) north of the military road, just to the north of the point where the military road passes over and between two knobs, and about 15 meters (49 feet) to the east of the highest point on the hill. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.313 meters (40.40 feet) from station, in azimuth $52^{\circ}17'$. In 1927 station recovered as described, except that a new graded road passes about 110 meters (361 feet) south of the station. Surface mark stamped "Urebeno 1917 Elev. 448.82 ft." In 1928 station again recovered and reported in good condition except that disk had been removed from reference mark. In 1932 recovered in good condition. Elevation of station, 136.80 meters (448.8 feet).

Ygnacio (Zapata County, C. L. Garner, 1917).—About $3\frac{1}{2}$ miles northeast of San Ygnacio and 1 mile east of the wagon road from San Ygnacio to La Union ranch. The station is best reached by following the military road one-third mile east from San Ygnacio and there taking the first road leading to the northeast for 2 miles to a dim road crossing. Turn sharply to the left, and follow a crooked road northeast about 1 mile to the top of a ridge. Leave the road and follow the top of the ridge east about one-half mile to the station, which is in heavy mesquite. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.975 meters (29.45 feet) from station in azimuth $316^{\circ}09'$. Elevation of station, 157.4 meters (516 feet).

Union (Zapata County, C. L. Garner, 1917).—About 12 miles northeast of San Ygnacio, $1\frac{1}{4}$ miles northeast of La Union ranch, and 50 meters (164 feet) west of an old road leading north from La Union ranch. Station may be located by inquiry at La Union ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Ref-

erence mark is standard reference disk in concrete, note 11 (a), 4.02 meters (13.2 feet) from station, in azimuth $38^{\circ}01'$. Elevation of station, 161.8 meters (531 feet).

Dan (Zapata County, C. L. Garner, 1917).—About 10 miles northeast of the Corralitos ranch on the military road and 1 mile north of a prominent single knob which is the western extremity of a long even ridge extending to the east. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.433 meters (34.23 feet) from station, in azimuth $357^{\circ}07'$. Elevation of station, 172.5 meters (566 feet).

Dolores (Zapata County, C. L. Garner, 1917).—About 3 miles north of the Mexican village of Dolores, one-half mile west of the military road, opposite the 16-mile post from Laredo, and in an open spot on the top of the easternmost of several hills. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), about 16 meters (52 feet) from the station, in azimuth $253^{\circ}56'$. In 1932 reported that station and reference marks had been destroyed. Elevation of station, 158.9 meters (521 feet).

George (Webb County, C. L. Garner, 1917).—On the highest point of a flat-top ridge, about 15 miles east of Laredo, 4 miles east of the Colorado ranch and on property belonging to this ranch, and 250 meters (820 feet) north of the road passing through the ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.030 meters (39.47 feet) from the station, in azimuth $171^{\circ}36'$. Elevation of station, 151.9 meters (498 feet).

Fort (Webb County, C. L. Garner, 1917).—About 7 miles southeast of Laredo and one-half mile south of the main traveled road, on top of the highest hill in the vicinity and about 25 meters (82 feet) from the downward slope of the hill. The station is best reached from Laredo by taking the military road about 3 miles south toward Zapata and one-half mile south of iron bridge, to where a road turns sharp to the east through a lane with irrigated fields on either side; follow this road about 3 miles to the top of a divide between two hills; here go through the gate and follow the old road one-fourth mile; then turn off to the left and follow the ridge to the top of the hill and station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.342 meters (47.05 feet) from the station, in azimuth $253^{\circ}32'$. Elevation of station, 202.1 meters (663 feet).

Casbeer (Webb County, C. L. Garner, 1917).—One mile northeast of an old wagon road and 1 mile north of the Texas-Mexican Railway, on top of the most prominent hill in the vicinity. To reach the station, follow the directions for station Taylor to the top of the hill, then continue on the road for $1\frac{1}{2}$ miles to a large dirt tank, and bear north of east across country to the top of the hill and station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.140 meters (26.71 feet) from the station, in azimuth $78^{\circ}10'$. Elevation of station, 205.6 meters (675 feet).

Taylor (Webb County, C. L. Garner, 1917).—About 10 miles due east of Laredo, 2 miles north of the Texas-Mexican Railway, 4 miles north of east of the target range, and $1\frac{1}{4}$ miles north of an old wagon road, on top of the highest rocky hill in this vicinity. To reach the station from Laredo, take the road along the street-car tracks about 4 miles toward the target range; about one-half mile before the range is reached the road forks; take the left road which passes between the stables and shacks at the range, downhill, through a gate, across railroad, past an old ranch and shack, to the south of a dirt tank, along a rough road about $4\frac{1}{2}$ miles from the target range to the top of a hill, then to the left along the backbone of the ridge to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.465 meters (27.77 feet) from the station, in azimuth $151^{\circ}38'$. Elevation of station, 203.6 meters (668 feet).

Laredo (Webb County, C. L. Garner, 1917).—On the southern end of a group of knobs in the east suburbs of Laredo, 200 meters (656 feet) west of a windmill, and on a range with the Mexican Presbyterian Church and about halfway between the radio masts. The station is on the highest part of the hill and about 15 meters (49 feet) south of the road passing over the hill. Station marked by

standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in concrete, note 11 (a), 11.525 meters (37.81 feet) from the station, in azimuth $3^{\circ}42'$. The station was reported destroyed in 1922. Elevation of station, 151.80 meters (498.0 feet).

Orvil (Webb County, C. L. Garner, 1917).—About $1\frac{1}{2}$ miles east of Orvil railway station, one-half mile north of a windmill on the southern end of a group of knobs which are covered with low brush and prickly pear. A new straight road leads across the railway at Orvil railway station to a windmill about $1\frac{1}{4}$ miles distant and just east of the road. The hill on which the station is located can be seen from the windmill, and it is about 300 meters (984 feet) beyond the nearest hills. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.95 meters (45.8 feet) from the station, in azimuth $54^{\circ}19'$. Elevation of station, 208.8 meters (685 feet).

Knob (Webb County, C. L. Garner, 1917).—About 6 miles direct and 9 miles by road north by west of Laredo, $1\frac{1}{2}$ miles south of the Laredo-Minera wagon road, one-half mile east of the Rio Grande, and 300 meters (984 feet) north of a wire fence, on top of the highest and most prominent knob in this vicinity. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.56 meters (44.5 feet) from the station, in azimuth $139^{\circ}33'$. Elevation of station, 154.7 meters (508 feet).

Fieldings (Webb County, C. L. Garner, 1917).—About 12 miles direct or 15 miles by road west of north from Laredo, 1 mile east-northeast of Clifton's ranch house, $1\frac{1}{2}$ miles east-northeast of the Laredo-Eagle Pass wagon road, on the top of the highest and most prominent hill in the vicinity. It is best reached from Laredo by following the Laredo-Minera wagon road about 12 miles to a fork of the road at the railroad crossing; take the right-hand road, cross the railroad, and follow 1 mile to a ranch house; passing in front of the ranch house, follow an old road $1\frac{1}{2}$ miles to the top of the hill to the eastward where the station is located. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 20.25 meters (66.4 feet) from the station, in azimuth $343^{\circ}06'$. Elevation of station, 203.5 meters (668 feet).

Davis (Webb County, C. L. Garner, 1917).—On the highest point of a flat hill among mesquite brush and cactus, 10 miles by road from Webb railroad station, 3 miles southeast of Marguerita ranch and one-half mile south of the old road leading eastward from that ranch. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.833 meters (45.38 feet) from the station, in azimuth $334^{\circ}44'$. From Webb railway station take Jefferies ranch road northwest $4\frac{1}{2}$ miles to forks, follow left fork to Marguerita ranch; go south 100 meters (328 feet) and follow old crooked road eastward about $2\frac{1}{2}$ miles to where road rounds north shoulder of flat hill; there turn south and follow ridge to highest point and station. From vicinity of Minera go to Tordillo settlement and follow road northeast to cemetery and crossroads; take main road leading northeast and follow main traveled road 8 miles to Marguerita ranch, and on to station as above. Elevation of station, 235.6 meters (773 feet).

Coleman (Webb County, C. L. Garner, 1917).—About 4 miles northeast of Minera. To reach this station, follow the direction for reaching station *Tordillo*; at one-half mile west of iron gate go through a fence and follow a dim road northward $1\frac{1}{2}$ miles to a dirt tank; from here follow the ridge to the north to the highest point of the south end of the ridge. This is a flat ridge, and the station is surrounded by brush and prickly pear. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.005 meters (42.67 feet) from the station, in azimuth $317^{\circ}42'$. Elevation of station, 203.0 meters (666 feet).

Tordillo (Webb County, C. L. Garner, 1917).—About 5 miles east of the Minera railroad station, 3 miles north of the Laredo-Minera wagon road, and 1 mile east of a wagon road leading from Minera to Tordillo settlement. To reach the station, go to the Laredo-Santo Tomas mines road at a point opposite the mines at Minera on the top of a hill, where there is a wire fence and gate to the east; go through the gate and follow the main traveled road northeast 3 miles to an iron gate and wire fence; take the right-hand road to the west of the fence and follow 1 mile to where the road bears southeast; turn eastward through brush

and follow the top of the ridge to the station, which is on the top of the most prominent hill in the vicinity and about one-half mile from road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.85 meters (48.7 feet) from the station, in azimuth $319^{\circ}57'$. Elevation of station, 186.3 meters (611 feet).

Tajone (Webb County, C. L. Garner, 1917).—About 6 miles northwest of the Webb railroad station, one-half mile southwest of the Webb-Jefferies ranch road, and one-half mile northwest of the windmill on the Tajone ranch. The station is best reached from Webb by taking the Jefferies ranch road 5 miles to a ridge, where there is a windmill one-eighth mile to the west; about one-third mile beyond turn off to the left, and the station is on the highest point of the ridge one-half mile distant. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.540 meters (41.14 feet) from the station, in azimuth $216^{\circ}37'$. In 1927 station was recovered as described. Surface mark was stamped "Tajone 1917 Elev. 779.84 ft.", and reference mark: "Tajone 1917 Elev. 779.79 ft." Elevation of station, 237.70 meters (779.9 feet).

Thomas (Webb County, C. L. Garner, 1917).—The station is best reached from the Sante Tomas mines by following the Sante Tomas mines-Carrizo Springs road north about 11 miles, past the Casa Blanca and Thomas ranches, to the top of a flat hill three-fourths mile north of the Thomas ranch. The station is about 25 meters (82 feet) east of the road, where there is practically no vegetation. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.710 meters (48.26 feet) from the station, in azimuth $339^{\circ}03'$. Elevation of station, 236.0 meters (774 feet).

Brewster (Webb County, C. L. Garner, 1917).—About 6 miles east of the Webb-Jefferies ranch and Asherton road, and 2 miles south by west from the Brewster ranch headquarters, on the highest point of the most prominent hill in the vicinity. To reach the station from the west, follow the Laredo-Asherton or Eagle Pass wagon road to the junction with the road from the Santo Tomas mines; take the road leading northeast, pass Brewster's trap and dirt tank, turning to the south through a dim road to a junction with a road from the west; turn back to the northward and follow the road to a white rocky hill, where the station is about 200 meters (656 feet) north of the road. From the point of leaving the Laredo-Eagle Pass wagon road it is about 7 miles to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16.422 meters (53.88 feet) from the station, in azimuth $50^{\circ}35'$. Elevation of station, 242.7 meters (796 feet).

Willie (Webb County, C. L. Garner, 1917).—In an open spot about 100 meters (328 feet) north of the sharp decline to the south, on the first prominent hill north of station *Thomas*, the south side of which hill shows as a white bluff. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.81 meters (28.9 feet) from the station, in azimuth $154^{\circ}43'$. Elevation of station, 239.4 meters (785 feet).

Cup (Webb County, C. L. Garner, 1917).—About 6 miles west of the Galvan ranch and 5 miles west of the Laredo-Eagle Pass wagon road, on the highest and most prominent hill in the vicinity. To reach the station from the Espejo ranch, follow the road eastward 1 mile to a fork; take the road to the south around a fence corner and follow 9 miles to a windmill and dirt tank; go west then south across country $1\frac{1}{2}$ miles to the highest hill, where the station is located. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 14.072 meters (46.17 feet) from the station, in azimuth $237^{\circ}34'$. Elevation of station, 243.8 meters (800 feet).

Galvan (Webb County, C. L. Garner, 1917).—About 4 miles northeast of the Galvan ranch headquarters, 5 miles east of the Webb-Jefferies ranch and Eagle Pass wagon road, on the eastern and highest knob of a long ridge extending from the vicinity of the ranch and culminating at this point. A prominent white rocky knob, the last to the east, is 200 meters (656 feet) east of the station. The station is best reached from the Galvan ranch by following the Encinal Road one-fourth mile to a dim road leading to the left through sand; follow this for 4 miles through a gate and over rocky ridges to the end of the ridge. There is an old

dirt tank one-fourth mile south of the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11a, 13.372 meters (43.87 feet) from the station, in azimuth $353^{\circ}52'$. Elevation of station, 254.8 meters (836 feet).

Cat (Dimmit County, C. L. Garner, 1917).—About 18 miles southwest of Asherton and one-third mile north of the road from the Catarina ranch to the settlement of Dentonio, on top of highest hill in vicinity. To reach the station from Catarina ranch, go west 4 miles to a fork of the road, take the right-hand road leading to the westward for about 300 meters (984 feet) then turn to the north and follow the ridge to the top of the hill. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 9.204 meters (30.20 feet) from the station, in azimuth $271^{\circ}30'$. Elevation of station, 220.4 meters (723 feet).

Twin (Webb County, C. L. Garner, 1917).—About 25 miles south of Asherton and 3.5 miles south of the Espejo ranch, 15 meters (49 feet) from the sharp descent on the east of the northern of twin flat-top hills, easily distinguished and known locally as "Las Hermanas." Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16.340 meters (53.61 feet) from the station, in azimuth $314^{\circ}35'$. Elevation of station, 244.2 meters (801 feet).

Tom (Dimmit County, C. L. Garner, 1918).—To reach the station from Dentonio follow the directions for reaching station *Big* to the windmill, tank, and fork of the road; take the right-hand road and follow $1\frac{1}{4}$ miles to the highest point of the flat ridge, where the station will be found 50 meters (164 feet) east of the road in an open place covered with white shale rock broken to small pieces. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11a, 18.359 meters (60.23 feet) from the station, in azimuth $103^{\circ}18'$. Elevation of station, 262.1 meters (860 feet).

Big (Webb County, C. L. Garner, 1917).—About 25 miles southwest of Asherton, 9 miles south of Dentonio settlement, 1 mile southwest of Catarina goat ranch. The station is on the top of a flat hill in an open space with a windmill about one-half mile distant in azimuth $227^{\circ}56'$. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16.885 meters (55.40 feet) from station in azimuth $323^{\circ}10'$. To reach the station from Dentonio, go south about 9 miles to a windmill, tank, and gate; passing through the gate to west, follow the left-hand fork of the road about three-fourths mile to a goat camp and one-third mile through thin brush to the station. Elevation of station, 261.6 meters (858 feet).

Dentonio (Dimmit County, C. L. Garner, 1918).—About $1\frac{1}{2}$ miles southeast of Dentonio. To reach the station from Dentonio, take the road south for Catarina ranch $1\frac{1}{4}$ miles across a small valley and up a fairly steep hill; turn to the east and follow the ridge one-half mile to the station, which is on the highest part and at the eastern extremity of the highest hill in the vicinity. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11.210 meters (36.78 feet) from the station, in azimuth $171^{\circ}39'$. Elevation of station, 250.7 meters (823 feet).

Carlów (Dimmit County, C. L. Garner, 1918).—About 4 miles north of Dentonio, on a long flat ridge extending northeast and southwest. The station may be reached from Dentonio by following the Carrizo Springs Road 3 miles to corner of a wire fence on the west side of the road, windmill, and wood tank about 50 meters (164 feet) west of the road, and a dim road crossing. Turn into this road to the east and follow 1 mile across a small valley to a hill on which the station is located. It is 10 meters (33 feet) south of a single Spanish dagger plant, 40 meters (131 feet) from the sharp decline to the south, and 40 meters (131 feet) from the decline to the west. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.954 meters (42.50 feet) from the station, in azimuth $307^{\circ}07'$. Elevation of station, 253.4 meters (831 feet).

Barr (Dimmit County, C. L. Garner, 1918).—About 6 miles southwest of Dentonio on a white rocky hill, the highest in the vicinity, and 9 meters (30 feet) north of what appears to be an old road crossing hill to westward. To reach the station from Dentonio, take the road west past the post office for $3\frac{1}{2}$ miles to a fork of the road; take the right-hand road leading through a gate to the westward and follow road past dirt tank, over flat ridge, past windmill and tank to a point 6.6 miles from Dentonio to where the road crosses over a hill and descends into a small valley; cross the first ditch or arroyo and turn to the right, where the station is located on the top of a hill about 150 meters (492 feet) north of the road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.258 meters (40.22 feet) from the station, in azimuth $239^{\circ}06'$. Elevation of station, 253.6 meters (832 feet).

English (Dimmit County, C. L. Garner, 1918).—About 13 miles southwest from Carrizo Springs, 7 miles northwest of Dentonio, one-half mile south of the Carrizo Springs-English ranch road, and one-half mile south-southwest from an old windmill derrick, the only one in this vicinity, on the highest point of a bare and very flat hill. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.237 meters (43.43 feet) from the station, in azimuth $144^{\circ}01'$. Station reached from Dentonio via Carrizo Springs road 1 mile, thence by left-hand fork 3 miles to 3 houses near road, 1 off to left, and thence by dim road about northwest to windmill about 2 miles distant, from which point old windmill derrick mentioned above can be seen. Elevation of station, 265.4 meters (871 feet).

Glass (Maverick County, C. L. Garner, 1918).—About 22 miles southwest of Carrizo Springs, $2\frac{1}{2}$ miles northwest of the Glass ranch headquarters, on a small rocky hill practically bare, but surrounded at a distance of about 30 meters (98 feet) by mesquite trees. From the Glass ranch take the road to the northwest $1\frac{1}{2}$ miles to a board gate; turn to the right and follow along the east side of the fence about three-fourths mile to a second board gate. Passing through the gate follow the fence on the right until the hill covered with small white rock is seen. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 15.830 meters (51.93 feet) from the station, in azimuth $214^{\circ}49'$. Elevation of station, 260.6 meters (855 feet).

Farland (Maverick County, C. L. Garner, 1918).—On the highest part of a flat rocky ridge, one-half mile west of the Eagle Pass-Blocker ranch road, and 165 meters (541 feet) east of a wire fence and telephone line supported on poles nailed to the fence posts. From Lopez tank follow the Blocker ranch road one-half mile, turn to the right and follow up the ridge one-half mile to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.420 meters (44.03 feet) from the station, in azimuth $92^{\circ}46'$. Elevation of station, 261.6 meters (858 feet).

Mack (Maverick County, C. L. Garner, 1918).—About $1\frac{1}{2}$ miles south of the McFarland stock pens. To reach the station from Lopez tank, take the left fork of the road, about 100 meters (328 feet) north of the tank, for about 1 mile to a wire fence and gate; turn to the south and follow the ridge to the station, about 100 meters (328 feet) south of the gate and 10 meters (33 feet) east of the fence. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 8.785 meters (28.82 feet) from the station, in azimuth $92^{\circ}59'$. Elevation of station, 260.0 meters (853 feet).

Indio (Maverick County, C. L. Garner, 1918).—About 4 miles southwest of the old Indio ranch, 15 miles northwest of Blocker's ranch, and one-half mile east of the Eagle Pass-Blocker ranch road, on a very flat ridge and in an open place. From McFarland ranch take the road south 9.2 miles past Lopez tank on the west side of the road and turn through the brush to the east 0.6 mile to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 9.410 meters (30.87 feet) from the station, in azimuth $175^{\circ}13'$. Elevation of station, 251.5 meters (825 feet).

Kennedy (Maverick County, C. L. Garner, 1918).—About 7 miles north of the McFarland ranch house and stock pens, on the top of a very flat hill with no dis-

For notes in regard to marking of stations see p. 154.

tinctive features. To reach the station from McFarland pens, take the road leading eastward to Glass ranch, passing through the board gate to the east of the dirt tank, and just north of the gate take the left road leading in a northeast direction and follow to a large dirt tank, around which are tall willows; here turn to the left and go across hills and small valleys about 3 miles past a second dirt tank to the station. The second dirt tank is about three-fourths mile from the station, in azimuth $326^{\circ}12'$. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12,808 meters (42.02 feet) from the station, in azimuth $172^{\circ}26'$. Elevation of station, 266.0 meters (873 feet).

Silo (Maverick County, C. L. Garner, 1918).—About 2 miles north of the Indio ranch, 102 meters (335 feet) west of the Indio ranch-Eagle Pass road, on the highest hill in the vicinity. Surface mark is standard station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13,485 meters (44.24 feet) from the station, in azimuth $87^{\circ}59'$. Elevation of station, 252.0 meters (827 feet).

Davidson (Maverick County, C. L. Garner, 1918).—To reach the station from Eagle Pass, take the Carrizo Springs wagon road east 12.5 miles to the top of a reddish hill which appears very steep from the east; pass through a wide wire gate in the fence to the south and follow this road south-southeast 3.3 miles and turn to the east across a flat ridge 0.4 mile to the station. An old windmill and shack plainly visible bear S. 20° E. from the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12,960 meters (42.52 feet) from the station, in azimuth $125^{\circ}16'$. Elevation of station, 262.0 meters (860 feet).

Eagle (Maverick County, C. L. Garner, 1918).—To reach the station from Eagle Pass, follow the Eagle Pass-San Antonio road about 3 miles northeast to the first gate; here turn to the right and follow a dim road 1 mile up the divide to the top of the ridge, where the station is located at the northwest extremity. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11,782 meters (38.65 feet) from the station in azimuth $231^{\circ}47'$. There is a rock cairn 8.8 meters (28.9 feet) from the station, in azimuth $324^{\circ}32'$. Elevation of station, 279.1 meters (916 feet).

Lone (Maverick County, C. L. Garner, 1918).—The station is best reached from Eagle Pass by taking the San Antonio road for 8 miles to the point where the road starts to drop from the top of the ridge to the valley by a fairly steep grade, and a lone tree can be seen on the hill to the east; turn east and follow the ridge 400 meters (1,312 feet) from the road to the highest point of the hill, where the station is located. The lone tree is about one-fourth mile distant in azimuth $68^{\circ}59'$. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16,100 meters (52.82 feet) from the station, in azimuth $260^{\circ}04'$. Elevation of station, 279.2 meters (916 feet).

Pass (Maverick County, C. L. Garner, 1918).—About 3 miles east-northeast from Eagle Pass on the top of the shoulder of the highest hill in the vicinity. From Eagle Pass take the Carrizo Springs road $2\frac{1}{4}$ miles to the first hill east of the Eagle Pass clubhouse; turn to the north through a wire fence and follow along the ridge one-half mile to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11,552 meters (37.90 feet) from the station, in azimuth $152^{\circ}03'$. Elevation of station, 276.2 meters (906 feet).

Laplace (Maverick County, C. L. Garner, 1918).—On "Hillcrest", the first hill northeast of Eagle Pass, about one-half mile from the courthouse, 90 meters (295 feet) northeast and 24 meters (79 feet) south from the road encircling the hill, 10 meters (33 feet) north of the range formed by the standpipe on the hill and the Eagle Pass clubhouse and on range with the courthouse and the southern end of the express office. Station mark is a standard disk station mark in concrete, note 1 (a). Reference mark is standard reference disk in bedrock, note 12 (a), 4 meters (13 feet) north of road, 39,990 meters (131.20 feet) from the station, in azimuth $181^{\circ}10'$. The standpipe is 100 meters (328 feet) from the station, in azimuth $311^{\circ}21'$. *Laplace latitude and longitude station* (see descrip-

tion thereof) is 3.52 meters (11.5 feet) true north from the station. Elevation of station, 256.84 meters (842.6 feet).

Nine (Maverick County, C. L. Garner, 1918).—Located 8.4 miles northwest of Eagle Pass post office, 5 meters (16 feet) south of wire fence and telephone line at side of road, and 20 meters (66 feet) west of sign, "9 miles to Hewitts Cafe, Eagle Pass, Tex." Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.252 meters (43.48 feet) from the station, in azimuth 319°43'. Elevation of station, 266.9 meters (876 feet).

Paloma (Maverick County, C. L. Garner, 1918).—Located 1½ miles east of the Paloma railroad station, three-fourths mile northeast of Paloma ranch, 29 meters (95 feet) northwest of the road leading from the Paloma ranch to the Eagle Pass-San Antonio road, and 125 meters (410 feet) west of a board gate through the wire fence, on the highest hill in the vicinity. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 16.147 meters (52.98 feet) from the station, in azimuth 343°13'. Elevation of station, 277.0 meters (909 feet).

Burr (Maverick County, C. L. Garner, 1918).—About 16 miles by road north of Eagle Pass, on top of a very flat ridge covered with heavy mesquite trees. To reach the station from Eagle Pass, take the Del Rio road, 8.5 miles to a gate on the north side of the road with a sign "Brackettville", passing through the gate follow the road 5 miles, keeping to the left to the second board gate, passing through this gate turn to the left through the brush and follow the ridge 1½ miles northwest to a wire gate, which is 95 meters (312 feet) east of the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.492 meters (44.27 feet) from the station, in azimuth 126°13'. Elevation of station, 272.2 meters (893 feet).

Pen (Maverick County, C. L. Garner, 1918).—About 6 miles northwest of the Paloma railroad station, ¾ miles northwest of the old Burr or Stone ranch which is on the Eagle Pass-Brackettville road, 425 meters (1,394 feet) in azimuth 306° from the stock pens on this ranch, between the forks of a road, 9 meters (30 feet) west and 150 meters (492 feet) east of them. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 13.765 meters (45.16 feet) from the station, in azimuth 190°59'. Elevation of station, 273.9 meters (899 feet).

Wiffp (Maverick County, C. L. Garner, 1918).—About 18 miles north by west from Eagle Pass, 3 miles northeast of the Lehman ranch, and 1½ miles south of the Wiffp ranch, on a prominent rocky knob, 300 meters (984 feet) west of the road leading from the Wiffp ranch to the Eagle Pass-Lehman ranch road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.280 meters (33.73 feet) from the station, in azimuth 277°38'. Azimuth from station of wood tank at Wiffp ranch is 173°40'. Elevation of station, 279.2 meters (916 feet).

White (Maverick County, C. L. Garner, 1918).—On the opposite side of the dry lake from station *Lake*. A white windmill, easily seen in this vicinity, is 120 meters (394 feet) from the station, in azimuth 176°55'. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.401 meters (34.12 feet) from the station, in azimuth 84°18'. Elevation of station, 279.6 meters (917 feet).

Lake (Maverick County, C. L. Garner, 1918).—On the west side of a dry lake and 200 meters (656 feet) in azimuth 175°33' from a windmill and tank. The station is best reached by leaving the Lehman ranch-Spofford road at a point about 2 miles southwest of Las Moras Creek and following for 6 miles a road leading to the south past the ruins of a house and stock pens to a windmill and dirt tank to east of road and the dry lake also to eastward. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11.435 meters (37.52 feet) from the station, in azimuth 277°23'. Elevation of station, 277.6 meters (911 feet).

Towne (Kinney County, C. L. Garner, 1918).—About 10 miles north of the Lehman ranch, 4 miles northwest of Towne's ranch, one-half mile northeast of McDonald's ranch house, windmill, and tank, and 1 mile east of the Del Rio-Lehman ranch road on the highest point and in a place practically bare and covered with rock. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 12.123 meters (39.77 feet) distant in azimuth $53^{\circ}43'$. The windmill at the McDonald ranch is distant about 1 mile in azimuth $26^{\circ}51'$. Station reached from Del Rio by following the Lehman ranch road for about 7 miles southwest of Dixie to where road ascends a hill and forks; left-hand road leads $1\frac{1}{2}$ miles to McDonald's ranch and station. Elevation of station, 280.4 meters (920 feet).

Jamerson (Kinney County, C. L. Garner, 1918).—In Mr. Jamerson's pasture 180 meters (591 feet) southwest from the Jamerson ranch house, 230 meters (755 feet) west of the Lehman ranch-Spofford road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 11.735 meters (38.50 feet) distant in azimuth $48^{\circ}16'$. The Jamerson ranch windmill is distant 180 meters (591 feet) in azimuth $205^{\circ}00'$. Elevation of station, 291.5 meters (956 feet).

Peters (Kinney County, C. L. Garner, 1918; 1924).—About 7 miles, airline, southwest of Macie railroad station, 1 mile east of the Brackettville-Macie-Dixie road, three-fourths mile south of the Peters ranch house (no longer owned by Peters), and 70 meters (230 feet) west from a road on that ranch, on a flat ridge covered with mesquite. In 1924 the station was recovered and re-marked as follows: Surface mark is a standard disk station mark, stamped "Peters 1918" in a block of concrete 26 inches square at bottom, 16 inches square at top, and 35 inches high, set 30 inches in ground, 5 inches projecting above the surface. Underground mark is a standard disk station mark stamped "Peters 1924" in a block of concrete 12 inches square and 8 inches thick, 32 inches below surface. Reference mark set in 1918 was a standard reference disk in square concrete post, note 11 (a), 9.620 meters (31.56 feet) from station in azimuth $104^{\circ}29'$. In 1924 it was reported 9.630 meters (31.59 feet) from station, in azimuth $102^{\circ}39'$. Windmill on the Peters ranch, distant about 0.75 mile from station, in azimuth $159^{\circ}17'$. In 1924 station was reached from Spofford or Brackettville to Macie railroad station, thence across the track and along plain road southwest 6 miles to forks of road, thence along road to left three-fourths mile to the Peters ranch house, passing through barn lots, and along road to south through pasture three-quarter mile to station. Elevation of station, 309.2 meters (1,014 feet).

Dixie (Kinney County, C. L. Garner, 1918).—About 2 miles northeast of the Del Rio-Eagle Pass road, $2\frac{1}{2}$ miles northeast of the Dixie schoolhouse and 300 meters (984 feet) west of the Dixie-Brackettville wagon road, on the top of the highest point in the vicinity. From Dixie follow the Dixie-Brackettville road 2 miles to the place where the road ascends a hill; turn off to the west and follow the ridge to the top of the hill and the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 15.840 meters (51.97 feet) from the station, in azimuth $104^{\circ}55'$. Silos at ranch distant 2.5 miles are in azimuth $56^{\circ}44'$ from station. Elevation of station, 292.6 meters (960 feet).

Ross (Kinney County, C. L. Garner, 1918; 1924).—About 13 miles east of Del Rio, about 6 miles southwest of Standart railway station on the Southern Pacific, and 5 miles northeast of the old Ross ranch, on a flat limestone ridge in the Ross pasture. From Del Rio follow the Del Rio-Eagle Pass wagon road about 5 miles; turn east 1 mile to red balanced gate; pass through gate and take right-hand road 10 miles to iron gate; then north $2\frac{1}{2}$ miles to board gate; then turn off to north and follow ridge one-half mile to station which is on highest point of bare rocky ridge. In 1924 station was reached from Macie on the Southern Pacific by following the highway to Standart, which could be reached from Brackettville by State Highway No. 3; at Standart cross the railroad west of depot and follow plain road—right fork through Ross pasture. About $3\frac{3}{4}$ miles from Standart road forks; take right-hand fork. Just before reaching gate turn off to right and follow highest ground three-fourths mile northwest to station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk

in concrete, note 11 (a) 14.340 meters (47.05 feet) from station, in azimuth 219° 56'. Azimuth of windmill in valley distant about 2 miles, is 180° 27'. Elevation of station, 335.0 meters (1,099 feet).

Brackett (Kinney County, C. L. Garner, 1918).—About 4 miles northeast of Brackettville on the highest point of Las Moras Mountain. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in solid rock, note 12 (a), 15.567 meters (51.07 feet) from station, in azimuth 285° 49'. An iron pipe, top broken off, possibly a U.S.G.S. mark, is 15.53 meters (51.0 feet) from station, in azimuth 8° 39'. In 1924 station reported lost. Replaced by station *Moras* (see description thereof). Elevation of station, 510.5 meters (1,675 feet).

Dobkins (Val Verde County, C. L. Garner, 1918; 1924).—About 6 miles east of Del Rio, 3½ miles southwest of Johnstone railway station, and 1½ miles northwest of Dobkins tank, on a flat limestone ridge in Dobkins pasture. In 1924 station was reached by State Highway No. 3 to Johnstone railroad station; there cross tracks and go one-fourth mile west of stock pens and follow road one-third mile southeast to ranch house. Pass through stock pens and follow road southward to three gates. Pass through the two gates on right, and follow road southward toward large dirt tank; pass through wire gate about 100 meters (328 feet) north of tank, and cross draw on north side of tank. Then head northwest, keeping on the highest, fairly open ground to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 15.158 meters (49.73 feet) distant, in azimuth 202° 53'. In 1924 station marks were recovered in good condition. Elevation of station, 341.9 meters (1,122 feet).

Hamilton (Kinney County, C. L. Garner, 1918; 1924).—About 21 miles by road northeast of Del Rio and 1½ miles west of the Hamilton ranch house, and 3½ miles southwest of the old Hamilton ranch house. The Al. Hamilton ranch house is well known for miles around. Station was reached from this ranch house in 1924 by going southwest about one-fourth mile to the road leading northwest and southeast, crossing this road, and heading westward up the draw to a wire gate. Pass through this gate and go northwest up the right to the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 18.390 meters (60.33 feet) distant in azimuth 208° 23'. In 1924 the station marks were recovered in good condition. Elevation of station, 449.3 meters (1,474 feet).

Johnstone (Val Verde County, C. L. Garner, 1918; 1919).—About 8½ miles east of Del Rio, 12 meters (39 feet) south of the Southern Pacific tracks at Johnstone siding, 15 meters (49 feet) east of the station board, and 3 meters (10 feet) north of the wire fence on the north side of the main road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 6.742 meters (22.12 feet) from the station, in azimuth 268° 43'. *Precise level bench mark E 31* is 220.35 meters (722.93 feet) distant in azimuth 248° 08'. *Johnstone latitude and longitude station* (see description thereof) is 6.578 meters (21.58 feet) west and 2.722 meters (8.93 feet) south of the triangulation station. Azimuth of windmill, distant one-fourth mile, is 213° 22'. Elevation of station, 326.91 meters (1,072.5 feet).

Moore (Val Verde County, C. L. Garner, 1918).—About 13 miles by road north by east of Del Rio and three-fourths mile west of the Del Rio-Ab Rose ranch road. To reach the station from Del Rio, follow the Ab Rose ranch road 11 miles to a point in a small valley where there is a gate on either side of the road and a windmill near a yellow earth embankment 1 mile northeast; turn west through the gate and follow a dim road to the windmill; cross an abandoned railroad grade, and the station is 300 meters (984 feet) west on top of a bare and prominent hill. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), 10.37 meters (34.0 feet) distant in azimuth 130° 06'. Azimuth of windmill, distant one-fourth mile, is 298° 40'. Elevation of station, 401.0 meters (1,316 feet).

Kelly (Val Verde County, C. L. Garner, 1918).—Located 7 miles north of Del Rio, 60 meters (197 feet) west of the Del Rio-Sonora road, 1 mile north of the point where the Comstock road turns to the west from the Del Rio-Sonora road,

and 4 meters (13 feet) south of the wire fence dividing the pastures. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), set under the wire fence, 10.275 meters (33.71 feet) from the station, in azimuth $287^{\circ}49'$. Elevation of station, 378.1 meters (1,240 feet).

Mark (Val Verde County, C. L. Garner, 1918).—On top of a prominent flat-top knob, 28 miles by road north of Del Rio, 3.5 miles north of Markwood ranch, one-half mile east of the Del Rio-Sonora road, and 400 meters (1,312 feet) south of a road leading to the east from the Del Rio-Sonora road. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete note, 11 (a), 15.205 meters (49.89 feet) from the station in azimuth $57^{\circ}18'$. Elevation of station, 576.4 meters (1,891 feet).

Feely (Val Verde County, E. H. Pagenhart, 1918).—About 12 miles south of Comstock and $2\frac{1}{2}$ miles southwest of Feely, a station on the Southern Pacific, on the highest point of hills westward of the wagon road leading south from Feely. Station marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in boulder, note 12 (c), set flush with the ground 9.90 meters (32.5 feet) distant in azimuth $4^{\circ}06'$. There is a cairn 5.20 meters (17.1 feet) from the station in azimuth $103^{\circ}27'$. Elevation of station, 426.6 meters (1,400 feet).

McNutt (Val Verde County, E. H. Pagenhart, 1918).—About 7 miles by road north of Comstock, $1\frac{1}{2}$ miles west of the Comstock-Juno wagon road, on the highest point of ground about one-half mile north of McNutt ranch house, and 18 meters (59 feet) west of a ranch road leading north from headquarters. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is standard disk station mark in bedrock, note 8 (a). Reference mark is standard reference disk in boulder, note 12 (c), set nearly flush with the ground, and 12.97 meters (42.55 feet) distant in azimuth $311^{\circ}04'$. There is a 7-foot cairn 9 meters (30 feet) from the station in azimuth $43^{\circ}43'$. McNutt windmill is distant 0.7 mile in azimuth $23^{\circ}05'$. Elevation of station, 606.6 meters (1,990 feet).

Jim (Val Verde County, E. H. Pagenhart, 1918).—About 8 miles north of Comstock in the McNutt pasture, and 100 meters (328 feet) east of a new wire fence. Station marked by standard disk station mark in rock outcrop, note 2. Reference mark is standard reference disk in bedrock, note 12 (a), 10.15 meters (33.3 feet) from the station in azimuth $306^{\circ}13'$. Station *Jim*, cairn (see description thereof) is 5.0 meters (16 feet) from the station in azimuth $11^{\circ}23'$. Elevation of station, 605.4 meters (1,986 feet).

Harrison (Val Verde County, E. H. Pagenhart, 1918).—About 52 miles by road north of Del Rio, 6 miles west from the point on the Del Rio-Sonora road where the Dry Devils River road leads to the west, 5 miles west of the Harrison ranch, 3 miles west of Anderson ranch, 1 mile southwest of the wagon road leading from the Harrison ranch to the Faucett ranch at the point where the road crosses the divide, and located on quite a prominent brush-covered ridge, about the highest in the vicinity. Station marked by a standard disk station mark in rock outcrop, note 2. Reference mark is standard reference disk in boulder, note 12 (c), 11.34 meters (37.2 feet) distant in azimuth $294^{\circ}44'$. There is a cairn 8.80 meters (28.87 feet) distant in azimuth $331^{\circ}40'$. Elevation of station, 653.8 meters (2,145 feet).

Blue (Val Verde County, E. H. Pagenhart, 1918; 1932).—About 31 miles by road west of north from Comstock, 3 miles west of the Comstock-Ozona ridge road, and one-fourth mile south of the Roberts ranch, now owned by Mr. Bob Cauthorn of Del Rio, on a prominent knob known as "Blue Hill." In 1932 reported that station and reference marks were bronze tablets set in rock. Reference mark was 14.68 meters (48.2 feet) from station in azimuth $114^{\circ}54'$. A new reference mark set in 1932 is a standard reference disk set in rock outcrop on a hill about 600 feet from station, in azimuth $336^{\circ}23'09''$. There are two windmills on the ranch; the one nearest the tank is about one-third mile from the station, in azimuth $160^{\circ}28'$. Elevation of station, 656.7 meters (2,155 feet).

Tippetts (Val Verde County, E. H. Pagenhart, 1918; 1934).—About 5 miles northeast of Langtry and 1 mile south of Tippetts, ranch, on highest hill in vicinity. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in outcropping bedrock, note 12 (a), 9.91 meters (32.5 feet) from station in azimuth $24^{\circ}03'$. The west gable of Tippetts ranch house is distant $1\frac{1}{4}$ miles in azimuth $188^{\circ}28'$. In 1932 marks were stamped "Tippetts, 1918-1932". In 1934

reported that Tippetts' house had been torn down, and station is on land belonging to John Ingram. Another standard reference disk stamped "Tippetts-1918-1934-No. 1" was set in outcropping bedrock, note 12 (a), on same knob as station, and 67.84 feet therefrom in azimuth $263^{\circ}35'$. Distance between reference marks is 89 feet. An azimuth mark stamped "Tippetts-1918-1934 azimuth" was set in like manner on second knob east-northeast of station and about one-fourth mile therefrom in azimuth $228^{\circ}22'37''$. A peak, rounded on top, is slightly east of east end of long high ridge, and about 25 miles from station in azimuth $340^{\circ}26'03''$. In 1934 to reach station from tourist camp at Langtry, go east 1.35 miles on United States route 90, turn left through gate onto dim unimproved road passing under east end of railroad bridge just after crossing concrete highway bridge, go 0.5 mile, cross old highway, continue straight ahead 0.1 mile to fork just after crossing rocky creek bottom, take right fork 0.4 mile, pass through narrow wood gate, continue 2.0 miles to wood gate with posts 12 inches square and 10 feet high, pass through and continue 0.5 mile, take right fork 1.0 mile, take another right fork 0.35 mile to dry creek bed. Station site is on highest knob on left side of draw as viewed from road. Turn left up left side of draw about 0.25 mile, leave truck and bear left to top of ridge and station site, about a 15-minute pack distance. Elevation of station, 551.3 meters (1,809 feet).

Babb (Val Verde County, E. H. Pagenhart, 1918; 1932).—About 19 miles north of Langtry, 15 miles south of Pandale post office, 10 miles south of the Pandale-Langtry crossing of the Pecos River, on the Babb ranch $1\frac{1}{2}$ miles northwest of headquarters, and about $1\frac{1}{2}$ miles northeast of "Highland C" windmill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 10.36 meters (34.0 feet) from station in azimuth $335^{\circ}19'$. An 8-foot cairn is 8 meters (26 feet) from the station in azimuth $292^{\circ}50'$. In 1932 station was recovered, marks in good condition. The 1918 reference mark was stamped "No. 2", and a new reference mark, a standard reference disk, stamped "No. 1", was set in an outcrop of bedrock 0.25 mile (speedometer) from station, in azimuth $253^{\circ}01'31''$. The following azimuths were also determined; Tip of wooden windmill 1 mile distant (probably "Highland C" mill), $29^{\circ}38'55''$; tip of wooden windmill, distant 1.5 miles, $191^{\circ}48'17''$. Elevation of station, 628.8 meters (2,063 feet).

Proctor (Val Verde County, E. H. Pagenhart, 1918; 1934).—On smooth level ridge about 4 miles south-southeast of Pumpville, 3 miles north-northwest of Hamilton ranch, 0.4 mile north of United States route 90, and 10 meters (33 feet) east of Pumpville-Hamilton-Langtry wagon road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a). No. 1, stamped 1918, is 11.51 meters (37.8 feet) from station, in azimuth $13^{\circ}59'$. No. 2, stamped 1934 is 55.30 feet from station in azimuth $123^{\circ}28'28''$. Azimuth mark 1934 (probably standard disk in concrete) is 50 feet east of north-and-south fence line which parallels route 90, 40 feet east of road leading to station, 60 feet northeast of red wooden gate, and about 0.4 mile from station in azimuth $03^{\circ}04'21''$. All marks project 4 inches. Reached from Langtry by following west on U S 90 for 10.7 miles to point where old highway crosses U S 90, turn right (north) pass through gate, then follow old road 0.4 mile to station site. Elevation of station, 562.7 meters (1,846 feet).

Ike (Val Verde County, E. H. Pagenhart, 1918).—On highest point of ridge, 20 miles by road north from Langtry, on "Bill Ike" Babb ranch, 2 miles north of "Highland C" windmill, and one-fourth mile northeast of ranch road leading northwest from this windmill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 9.35 meters (30.7 feet) from station, in azimuth $233^{\circ}33'$. A scrub cedar is distant 4.4 meters (14 feet) in azimuth $150^{\circ}44'$, and small clump of cedars 11 meters (36 feet) in azimuth $333^{\circ}37'$. Elevation of station, 630.8 meters (2,070 feet).

Bassett (Val Verde County, E. H. Pagenhart, 1918).—About 10 miles north of Pumpville, 7 miles by road north from old Bassett headquarters ranch, one-half mile south of ranch house and windmill belonging to W. I. Babb, on second range of hills passed in going north from old Bassett headquarters, on prominent knob just west of road, the highest point of this knob being distant about one-half mile. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 14.02 meters (46.0 feet) from station in azimuth $266^{\circ}20'$. A small

cairn is 10 meters (33 feet) from the station in azimuth $102^{\circ}53'$. Elevation of station, 643.1 meters (2,110 feet).

Peggy (Terrell County, E. H. Pagenhart, 1918; 1934).—About 10 miles southeast of Dryden, 2 miles southeast from Taylor's ranch, on the highest point of a long flat ridge extending east and west and 20 meters (66 feet) north of the Dryden-Mucca Spring road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Station mark projects 2 inches. Reference mark is standard reference disk in concrete, note 11 (a), 10.11 meters (33.2 feet) from the station in azimuth $97^{\circ}33'$. In 1934 station further described as being on land owned by Joe Kerr of Sanderson and leased by Jess Haley, 182 feet northwest of northwest corner of Kerr ranch house, 73 feet in azimuth $271^{\circ}26'$ from center of concrete water tank 52 feet in diameter, about 200 yards southwest of oil derrick, and about 100 yards northeast of windmill. To reach from Kerr's store in Dryden go east on U S 90, 6.8 miles to gate with 10-inch posts on south side of road about 100 yards east of small concrete bridge, pass through gate and follow south 0.5 mile on unimproved road to fork, take right fork and follow main road 1.3 miles to gate, pass through gate and continue south along fence 0.7 mile to fork, and take left fork 0.5 mile to ranch house and station site. R.M. 1918 is flush with ground and 40 feet east of center of concrete water tank. Another reference mark and azimuth mark were set according to note 11 (a), R.M. 1, 1918-1934 projects 1 inch, is 10 feet east of east end of concrete sheep water trough and 64.91 feet from station, in azimuth $193^{\circ}13'15''$. Azimuth mark 1918-1934 is standard disk in concrete, note 11 (a) projecting 5 inches, 6 feet south of east-and-west fence, north of road leading to station, and 0.3 mile from station, in azimuth $150^{\circ}11'09''$. Elevation of station, 656.5 meters (2,154 feet).

Hoddy (Terrell County, E. H. Pagenhart, 1918).—About 38 miles northeast from Dryden, 15 miles by road north by west from Pumpville, 8 miles north from the old Bassett headquarters ranch, 2 miles east of north of Bassett's 7-mile windmill, 200 meters (656 feet) east of a wagon road, and on the highest point in the vicinity. The remains of a stone fireplace built by the light keeper, 20 meters (66 feet) west of the station, shows from the road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 7.78 meters (25.5 feet) from the station in azimuth $52^{\circ}42'$. Elevation of station, 659.3 meters (2,163 feet).

Eldridge (Terrell County, E. H. Pagenhart, 1918; 1934).—About 4 miles southwest of Dryden, 12 miles southeast of Sanderson, 4 miles south of railroad on highest point of small slightly pointed knob which is highest in vicinity. To reach from underpass at southeast edge of Sanderson, go southeast on U S 90, 14.95 miles, turn right (south) on unimproved dirt road in lane and go 0.5 mile to cattle guard at end of lane, continue south along fence 0.15 mile to steel gate in fence, turn left through gate and continue east 0.8 mile to fork in road, take right fork 0.4 mile to gate in fence surrounding windmill pumping station and concrete water tank (there is a ranch house to east), turn south through gate and go 0.15 mile across this yard to second gate, go through this gate and continue on winding unimproved dirt road that crosses field in south-southwesterly direction 1.8 miles to station site on knoll. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference and azimuth marks are standard reference disks in concrete, note 11 (a). R.M. 1918 is on same knoll as station and 11.80 meters (38.7 feet) from it in azimuth $81^{\circ}39'$. R.M. No. 1 and azimuth mark were added in 1934. R.M. No. 1 is on same knoll as station and 12.54 meters (41.1 feet) from it in azimuth $161^{\circ}49'$. Azimuth mark is next to north-and-south fence and 0.3 mile from station in azimuth $111^{\circ}01'01''$. Following azimuths are from station: Dryden airport, west pylon, $210^{\circ}15'16''$; Dryden airport, east pylon, $211^{\circ}20'28''$. Elevation of station, 712.7 meters (2,338 feet).

Hen (Terrell County, E. H. Pagenhart, 1918).—About 6 miles by road north from Dryden, 1 mile west of the Dryden-Sheffield Road, one-half mile southwest of a dirt tank, and 100 meters (328 feet) east of an old stone quarry. Surface and underground marks are standard disk station marks in concrete, note 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 8.50 meters (27.9 feet) from the station in azimuth $238^{\circ}40'$. A windmill near the road is $1\frac{1}{2}$ miles from the station in azimuth $273^{\circ}57'$. Elevation of station, 711.8 meters (2,335 feet).

Dryden west base (Terrell County, E. H. Pagenhart, 1918).—On the Southern Pacific right-of-way at the first curve about 4 miles west of Dryden, at the point

of intersection of tangents of north rail. Station marked by standard disk station mark in concrete, note 1 (a). The reference mark is precise level bench mark N27, which is a bronze disk set in a concrete post about 14 meters (46 feet) south of the track near milepost 498, and 128.94 meters (423.0 feet) from the station in azimuth $81^{\circ}22'$. Elevation of station, 675.81 meters (2,217.2 feet).

Dryden east base (Terrell County, E. H. Pagenhart 1918; 1919).—On the first ridge about three-fourths mile east of Dryden, on the prolongation of the north rail tangent of the main track of the Southern Pacific. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark in standard reference disk in concrete, note 11 (a), 45.97 meters (150.8 feet) distant in azimuth $98^{\circ}21'$. *Dryden east base latitude and longitude station* is 12.34 meters (40.5 feet) true north from the triangulation station and is marked by a temporary wooden pier. Azimuth to *Dryden water tank*, distant three-fourths mile, is $98^{\circ}44'37''$. Elevation of station, 645.56 meters (2,118.0 feet).

Road (Terrell County, E. H. Pagenhart, 1918; 1934).—About $11\frac{1}{2}$ miles southeast from Sanderson, 6 miles south of the Southern Pacific tracks, 12 miles west-southwest from Dryden, 300 meters (984 feet) east of the Sanderson-Twin Buttes road 2 miles south from a masonry tank, on long flat ridge that runs southeast and northwest. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a). In 1934 station and reference mark found as described in good condition and new R.M. and azimuth mark were added according to note 11 (a). Old station mark was stamped "Road 1918-1934" and new marks stamped "Road 1934." R.M. 1918 is 11.90 meters (39.0 feet) from the station, in azimuth $268^{\circ}23'$. R.M. 1934 is 17.79 meters (58.4 feet) from the station in azimuth $34^{\circ}41'$. Azimuth mark is about 100 yards south of forks in main road and about one-half mile from station in azimuth $104^{\circ}15'28''$. A 4-foot rock cairn is 16 meters (52 feet) from the station, in azimuth $88^{\circ}40'$. Chimney at south end of ranch house is about 10 miles from station in azimuth $289^{\circ}14'$. To reach from Sanderson take route 90 east 6.3 miles to top of hill, turn right, go south through gate on graded dirt road 2.35 miles, turn in on left fork and follow east and south on unimproved road 0.95 mile, take right fork for 0.1 mile to lumber gate, through gate for 0.8 mile, thence right fork 0.2 mile to gate, continue 1.7 miles to another gate, then south 0.5 mile, here leave main road taking left fork on dim road along top of ridge for 0.35 mile, then leave road, turn right (south) for 0.05 mile to station site. Elevation of station, 741.0 meters (2,431 feet).

Sanderson (U.S.G.S.) (Terrell County, E. H. Pagenhart, 1918).—About 4 miles northeast of Sanderson. To reach the station, follow the Sanderson-Sheffield wagon road $2\frac{1}{2}$ miles from Sanderson to a byroad leading northeast; follow this past a windmill and tank and continue up the valley $1\frac{1}{2}$ miles to summit; from here the station is 1 mile east on the highest point in the vicinity. The station is marked by a Geological Survey triangulation disk set in a boulder. Reference mark no. 1 is a standard reference disk in a boulder, note 12 (c), on north slope of rounded ridge, 1 meter (3 feet) lower than station, and 34.05 meters (111.7 feet) therefrom in azimuth $217^{\circ}51'$; no. 2 is a drill hole with an 8-inch arrow, cut in an outcrop on the east slope of the hill, 4 meters (13 feet) lower than, and 28.75 meters (94.32 feet) from station in azimuth $312^{\circ}35'$; no. 3 is a drill hole, with a 14-inch arrow, cut in a flat rock on the south side of the hill, 4 meters (13 feet) lower than station and 37.70 meters (123.69 feet) from it in azimuth $22^{\circ}47'$. Elevation of station, 1,082.5 meters (3,552 feet).

New (Terrell County, E. H. Pagenhart, 1918; 1934).—About 7 miles southwest of Emerson, on southern end of flat-topped knob on ridge. To reach from Emerson railroad station go west on route 90, 1.65 miles to point about 50 yards east of concrete highway bridge, turn left off road through gate, pass under railroad bridge, and through second gate, take right fork and follow improved dirt road west along south side of railroad tracks 1.2 miles, leave railroad here and follow main road south 1.4 miles to gate just north of top of divide, continue south on main road down creek 2.5 miles to gate, thence 1.25 miles to forks, take left fork on main road 0.4 mile to dirt tank on right, leave main road, make U turn to right and go in westerly direction on old dim road 0.15 mile, take left fork 0.45 mile to point about 50 yards west from top of divide and rock cairn about 3 feet high just north of road. This is as far as truck can be driven. From this point station site is about three-fourths mile northwest in approximate magnetic azimuth 300° . Station is marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in outcropping bedrock, note 12 (a), projecting about 5 inches 12.17 meters (39.9 feet) from station in azimuth $135^{\circ}02'$. There

is a cairn 32.0 meters (105 feet) distant in azimuth $180^{\circ}59'$. A green bush is 12.2 meters (40 feet) from station, in azimuth $253^{\circ}59'$; and another 3 meters (10 feet), 15° . In 1934 station recovered in good condition. New reference mark and azimuth mark were established marked by bronze tablets set in bedrock, note 12 (a). R.M. (1918) (1934), flush with ground, is 12.47 meters (40.9 feet) from station in azimuth $51^{\circ}53'$. Azimuth mark is about 0.25 mile from station in azimuth $294^{\circ}59'44''$. All marks are on same knoll. Elevation of station, 921.8 meters (3,024 feet).

Dry (Brewster County, E. H. Pagenhart, 1918).—About 6 miles west of Longfellow, $1\frac{1}{2}$ miles south from old Purinton beef well in Dry Valley, on highest point of first hill on south side of Dry Valley, which is highest hill in vicinity, and 5 meters (16 feet) from north cap rock. Station marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in boulder, note 12 (c), set near northern edge of cliff, 31.59 meters (103.6 feet) from station in azimuth $120^{\circ}24'$. *Tres Hermanos (cairn)* (see description thereof) is 14.5 miles from station in azimuth $44^{\circ}57'24''$. Elevation of station, 1,368.1 meters (4,489 feet).

Pyle (Pecos County, E. H. Pagenhart, 1918).—About 15 miles northwest from Longfellow, 5 miles northeast from the old Purinton ranch, 3 miles north from the old Baxter ranch, now headquarters for Pyle ranch, 1 mile southeast from Bull trap mill and tank in Big Canyon on top of the mesa, and about three-fourths mile from a dim road which leads up and across the mesa. Surface mark is a standard disk station mark in boulder, note 4. Underground mark is copper bolt in boulder, note 9 (c). Reference mark is standard reference disk in boulder, note 12 (c), 19.54 meters (64.1 feet) from station in azimuth $156^{\circ}47'$. Elevation of station, 1,298.5 meters (4,260 feet).

Brown (Brewster County, E. H. Pagenhart, 1918).—About 4 miles northeast of Haymond, $2\frac{1}{2}$ miles southwest from Brown's goat ranch in Dry Valley, on the southernmost and highest of the Housetop Mountains, 10 feet from the sheer west face, and about 5 meters (16 feet) north of a United States Geological Survey cairn. Surface mark is standard disk station mark in boulder, note 4. Underground mark is standard disk station mark in bedrock, note 8 (a). Reference mark is standard reference disk in boulder, note 12 (c), about 10 meters (33 feet) from cliff, and 19.93 meters (65.4 feet) from station in azimuth $217^{\circ}59'$. Azimuth of U.S.G.S. cairn is 19° . Elevation of station, 1,664.1 meters (5,460 feet).

Nation (Pecos County, E. H. Pagenhart, 1917).—About 15 miles north from Marathon and three-fourths mile east of the Marathon-Fort Stockton road, 1 mile north from the Pumpkin Center schoolhouse, on a prominent rounded knob at the southwest end of the range of hills. Station mark is standard disk station mark in boulder, note 4. Underground mark is standard disk station mark in bedrock, note 8 (a). Reference mark is standard reference disk in boulder, note 12 (c), set flush with the ground on the eastern slope of the knob, $1\frac{1}{2}$ meters (5 feet) lower than, and 11.71 meters (38.4 feet) from station in azimuth $288^{\circ}19'$. Elevation of station, 1,561.9 meters (5,124 feet).

Madera (Pecos County, E. H. Pagenhart, 1917).—About 20 miles south of Fort Stockton, 2 miles southeast of Elsinore Cattle Co. headquarters, one-half mile east of the Fort Stockton-Marathon road, on the southeastern one of two tops of the Sierra Madre Mountains. Station marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in bedrock, note 12 (a), set on the southwest end of the ridge, 1 meter (3 feet) lower than, and 17.38 meters (57.0 feet) from station in azimuth $4^{\circ}29'$. It projects about 8 inches above ground. Elevation of station, 1,401.9 meters (4,599 feet).

Ord (U.S.G.S.) (Brewster County, E. H. Pagenhart, 1917).—About 12 miles southeast of Alpine, 2 miles east of the Alpine-Terlingua road, and on the highest point of Mount Ord. The station mark is that of the United States Geological Survey station, which is a triangle and the letters U.S. chiseled in a flat rock flush with the ground about the center of the ridge. Reference mark is standard reference disk, note 12 (c), in an outcrop about 2 feet high, and 12.68 meters (41.6 feet) from station in azimuth $338^{\circ}04'$. *Ord (U.S.G.S.) cairn* (see description thereof) is on the eastern end of the top, 16.6 meters (54 feet) from station in azimuth $337^{\circ}07'$. Elevation of station, 2,076.9 meters (6,814 feet).

Chancellor (Pecos County, E. H. Pagenhart, 1917).—About 20 miles southwest of Fort Stockton, 3 miles due east from Chancellor, near the highest point of a small conical hill, known locally as "Pikes Peak." The Chancellor-Elsinore ranch road passes 1 mile south of the station. The station is marked by a standard disk station mark set in the flat top of rock flush with the ground.

Reference mark is a standard reference disk in bedrock, note 12 (a), 2 inches above the ground, 3 meters (10 feet) north of the highest point of the hill, and 5.24 meters (17.2 feet) from station in azimuth $28^{\circ}33'$. Elevation of station, 1,175.9 meters (3,858 feet).

Beard (Pecos County, E. H. Pagenhart, 1917).—About 50 miles south of west from Fort Stockton, 20 miles northwest from Hovey, a town on the Kansas City, Mexico & Orient Railroad, 5 miles northwest from Stone's ranch, which is located about 2 miles north of the Fort Stockton-Lympia Creek-Fort Davis road, on the highest point of Beard Mountain, which forms a knob at its northeastern end, and immediately north of a large rocky outcrop which marks the highest point of the mountain. Station marked by a standard disk station mark in boulder, note 4. Reference mark is standard reference disk, note 12 (c), set in the outcrop mentioned above, 1 meter (3 feet) above and 2.76 meters (9.1 feet) from station in azimuth $59^{\circ}18'$. Elevation of station, 1,527.6 meters (5,012 feet).

Star (Jeff Davis County, E. H. Pagenhart, 1917).—About 15 miles south of Balmorhea, a town on Pecos Valley & Toyahvale Railway, 18 miles north of Fort Davis, 2 miles west of Fort Davis-Lympia Creek-Fort Stockton wagon road, at Lympia post office, at point where Balmorhea road branches to west, near center of east-and-west flat-topped mesa known as "Star Mountain" and about 15 meters (49 feet) from north cliff. Station marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk, note 12 (c), set in rock about 2 feet square and 18 inches high about midway of ridge north-and-south, and 14.06 meters (46.1 feet) from station in azimuth $13^{\circ}08'$. Following distances and azimuths are from station: *Black Mountain*, 11.8 miles, $71^{\circ}17'42''$; *Mitre Peak* (cairn), 20 miles, $358^{\circ}52'33''$; *Star* (U.S.G.S.) (see description thereof), 28.32 meters (92.9 feet), $295^{\circ}50'$; *Tree* (U.S.G.S.) (see description thereof), 21.7 meters (71 feet), $297^{\circ}02'$. Elevation of station, 1,933.8 meters (6,344 feet).

Baldy (Jeff Davis County, E. H. Pagenhart, 1917).—On Baldy Peak, about 25 miles northwest of Marfa, 15 miles east of Valentine, 10 meters (33 feet) east of west end of narrow-topped ridge about 3 meters (10 feet) wide at station, and 3 meters (10 feet) east of large hole. Station marked by standard disk station mark in bedrock, note 2. Reference mark is standard reference disk in bedrock, note 12, on south side of cliff one-half meter (2 feet) lower than, and 5.43 meters (17.8 feet) from station in azimuth $296^{\circ}37'$. *Baldy* (U.S.G.S.) (see description thereof) is distant 5.60 meters (18.4 feet) from station in azimuth $267^{\circ}44'$. A small hole is distant 5.095 meters (16.72 feet) in same azimuth. Elevation of station, 2,553.7 meters (8,378 feet).

Supplementary points

Banco (United States and Mexico boundary monument R.P. no. 17) (Hidalgo County, C. V. Hodgson, 1917).—On west side of military wagon road, 2.3 miles direct or 5 miles by road south of station *Mamie* (see description thereof). Marked by a truncated pyramid $2\frac{1}{2}$ feet high with bases 12 and 18 inches square, resting on a concrete base 2 feet square and 2 feet deep. Word "Banco" and number thereof stamped in concrete. Iron plate on top of monument is marked with cross and letters "I B C" and "C de L." Elevation of station, 37 meters (121 feet).

United States and Mexico boundary monument R.P. no. 4 (near United States and Mexico boundary, C. L. Garner, 1917).—A reference monument of the International Boundary Commission, consisting of concrete truncated pyramid $2\frac{1}{2}$ feet high with bases 12 and 18 inches square, resting on concrete base 2 feet square and 2 feet deep. Word "Banco" and number thereof stamped in concrete. Iron plate on top of monument is marked with cross and letters "I B C" and "C de L." Station is 150.58 meters (494.0 feet) in azimuth $82^{\circ}57'03''$ from station *Monument* (see description thereof). Elevation of station, 47 meters (154 feet).

Laredo latitude station (Webb County, G. R. Putnam, 1895; 1919).—Undescribed point, 1.74 meters (5.7 feet) due west from *Laredo longitude station* (see description thereof).

Laredo longitude station (Webb County, E. Smith, G. R. Putnam, 1895; 1932).—At northwest corner of Fort McIntosh parade field, at northwest entrance to fort, 100 feet southeast of gate, 37.95 meters (124.5 feet) S. 62° W. (magnetic) from northeast entrance to Fort McIntosh (center of gateway in line of Victoria Street), 94.34 meters (309.5 feet) S. 36° E. (magnetic) from east corner of hospital, and 62.627 meters (205.47 feet) north and 43.034 meters (141.19 feet) west of

Laredo, north wireless mast. Marked by brick pier 17 by 27 inches in cross section, with 24 inches below surface and 36 inches above. Brass plate 8 by 11 inches, bolted to top of pier, bears following inscription: "U.S. Coast and Geodetic Survey, latitude $27^{\circ}30'29''$.7, longitude $99^{\circ}31'02''$.58."

Isabel (Webb County, C. L. Garner, 1917).—About 1.7 miles west by north of San Isabel railroad station, 200 meters (656 feet) north of the Laredo-Minera wagon road at a point where the road is cut across the hills, and to the northward of cultivated fields in which there are a number of tenant houses painted red. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), about 25 meters (82 feet) north of station. Elevation of station, 164 meters (538 feet).

Red (Dimmit County, C. L. Garner, 1918).—About 7 miles north of west from Dentonio, 500 meters (1,640 feet) north of an old windmill in the Salzanora pasture. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a). Its distance and azimuth from station not recorded. Elevation of station, 262 meters (860 feet).

Laplace latitude and longitude station (Maverick County, W. B. Fairfield, 1919).—Marked by a temporary wooden pier 3.52 meters (11.5 feet) due north of station *Laplace* (see description thereof).

Johnstone latitude and longitude station (Val Verde County, J. E. McGrath, 1919).—Marked by a temporary wooden pier 6.578 meters (21.58 feet) west and 2.722 meters (8.93 feet) south of station *Johnstone* (see description thereof).

B.M. E 31 (Val Verde County, C. L. Garner, 1918).—About 2.1 miles east of Johnstone, on Southern Pacific Railroad, at milepost 370, and about 50 feet south of track. Mark is standard disk bench mark, stamped "E 31 1917 1085.54", in top of concrete post, and 220.35 meters (722.9 feet) in azimuth $248^{\circ}08'06''$ from station *Johnstone* (see description thereof).

Jim, cairn (Val Verde County, E. H. Pagenhart, 1918).—A 7-foot cairn, 5 meters (16 feet) in azimuth $11^{\circ}23'$ from station *Jim* (see description thereof).

Word (Val Verde County, E. H. Pagenhart, 1918).—About 33 miles east of north from Comstock, 6 miles east of north from the lower Word ranch, and 4 miles south from Martin's ranch which is near Juno. The station is probably marked with a standard disk station mark described in note 1 (a). Elevation of station, 649 meters (2,129 feet).

Dryden east base latitude and longitude station (Terrell County, W. B. Fairfield, 1919).—Distant 12.34 meters (40.5 feet) due north of station *Dryden east base* (see description thereof). Marked by a temporary wooden pier.

Ord (U.S.G.S.) cairn (Brewster County, E. H. Pagenhart, 1917).—A cairn distant 16.6 meters (54 feet) in azimuth $337^{\circ}07'$ from station *Ord (U.S.G.S.)* (see description thereof).

Star (U.S.G.S.) (Jeff Davis County, E. H. Pagenhart, 1917).—A flat-topped rock 18 by 12 inches almost flush with ground, about 40 meters (131 feet) south of north edge of cliff. Station *Star* (see description thereof) is 28.32 meters (92.9 feet) distant in azimuth $115^{\circ}50'$.

Tree (U.S.G.S.) signal (Jeff Davis County, E. H. Pagenhart, 1917).—A lone trimmed cedar tree about 2 meters (7 feet) west of *Star (U.S.G.S.)* (see description thereof). Station *Star* (see description thereof) is 21.7 meters (71 feet) distant in azimuth $117^{\circ}02'$.

Baldy (U.S.G.S.) (Jeff Davis County, E. H. Pagenhart, 1917).—On Baldy Peak, about 25 miles northwest of Marfa. Marked by triangle 6 inches on a side and 1 inch deep with small knob in middle, cut in rock with letters "U.S." Station *Baldy* (see description thereof) is distant 5.60 meters (18.4 feet) in azimuth $87^{\circ}44'$. A small hole is distant 0.505 meter (1.66 feet) in same azimuth.

SAN ANTONIO-DEL RIO ARC

Principal points

Miller (Bexar County, H. Odessey, 1924).—About 13 miles northeast of San Antonio, one-fourth mile southeast of the San Antonio-Austin road known as the Meridian Highway and as the Pat Neff Highway, also as State Highway No. 2. Station is about 1 mile northeast of the Friesenhaha gasoline station and garage, on the most northern one of the two long hills in a mesquite pasture on the Miller ranch. The ranch house is about three-fourths mile south of the station. Sur-

For notes in regard to marking of stations see p. 154.

face mark is standard disk station mark in concrete, note 1 (a); underground mark is iron nail in concrete block, note 7 (c). Station *Miller* (U.S.G.S.) (see description thereof), marked with an iron pipe, is 3.071 meters (10.08 feet) from station in azimuth 248°31'. Elevation of station 310.8 meters (1,020 feet).

Bulverde (Bexar County, H. Odessey, 1924).—About 2 miles directly east of Bulverde post office, one-half mile west of the East Bulverde-Sunshine Valley road, about 13 miles by road north of Wetmore, a small town and post office on the International & Great Northern Railway and on the southernmost of three prominent hills south of Cibolo Creek, on the highest point in the vicinity. Top of hill is a mass of flat rock and is covered with cedar and scrub oak about 10 feet high. Station is on land belonging to Herman Uecker, who lives at the base of the hill one-fourth mile south of the station. Station marked by standard disk station mark cemented in bedrock, note 3. Station *Bulverde* (U.S.E.) (see description thereof) is on same rock, 0.130 meter (0.43 foot) from station, in azimuth 70°17'. Two reference marks were set, standard reference disks in bedrock, note 12 (b); No. 1 is 10.933 meters (35.87 feet) from station, in azimuth 257°12'; no. 2, 22.829 meters (74.90 feet), 68°44'. Station reached from Wetmore railway station by following the Bulverde road about 10 miles to fork and taking right-hand road about 2½ miles to gate leading into Herman Uecker's ranch on left. Elevation of station, 424.6 meters (1,393 feet).

Mission ecc. (Comal County, H. Odessey, 1924).—On Mission Hill, about 3 miles by road west of New Braunfels, on property of Mr. Coreth, about 33 yards north of old home dwelling and 7½ yards south of house built by Mr. Coreth's son. In 1924 station *Mission* (see description thereof) was recovered but could not be occupied, as it was but 8 inches from south foundation wall of new house. The 1903 station is identical with station *Mission Hill* (U.S.G.S.), which is marked with iron pipe with screw-top tablet set in concrete, and is 6.536 meters (21.44 feet) from the 1924 station in azimuth 195°02'52". The 1924 station, called *Mission eccentric* to distinguish it from the old station, is marked underground by a standard disk station mark set in bedrock, note 8 (a), and at surface by standard disk station mark set in concrete, note 1 (a).

Hillcrest (Bexar County, H. Odessey, 1924).—About 8 miles northwest of San Antonio, about one-third mile south of the Babcock Road, about 75 meters (246 feet) west of the Hillcrest Country Club building, and 25 paces west of the west line of the club property, on the highest point of the hill, in a partly cleared spot in the brush. Owner of ground unknown. Station is about 38 paces west of U.S.G.S. station Gembrills, which is marked with a screw cap on iron pipe and stands at the southeast corner of a small house occupied by the caretaker of the club. House is between the two stations. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is an iron nail in concrete, note 7 (c). Reference mark is standard reference disk in concrete, note 11 (a), on west side of club property and 26.650 meters (87.43 feet) from station, in azimuth 253°53'. Elevation of station is 296.2 meters (972 feet).

Smith (Bexar County, H. Odessey, 1924).—About 32 miles by road or 23 miles direct northwest of San Antonio, 8 miles south of Boerne, 2 miles southwest of Tim Schwoppe's house on Balcones Creek, and northeast of San Geronimo Creek. It is on a rocky ridge covered with trees about 20 feet in height. Surface mark is a standard disk station mark in rock, note 3. Two reference marks were set, standard reference disks in concrete, note 12 (b). No. 1 is 12.688 meters (41.63 feet) from station, in azimuth 69°38'; no. 2, 29.066 meters (95.36 feet), 119°38'. *Smith* (U.S.G.S.) (see description thereof), is on the same rock; it is marked by a tablet, one side of which has been broken off. It is 0.155 meter (0.51 foot) from station, in azimuth 5°13'. From Boerne garage take road westward 4 miles to Balcones Creek, then up Balcones Creek, about 1¼ miles to Mr. Schwoppe's house, thence up the draw through pastures to top of divide where old trail descends into canyon to southwest. From top of divide station bears southwest and is distant about one-half mile. Go up the point of ridge to left to top of ridge, cross head of small canyon, and follow ridge southwest to station. Elevation of station, 576.7 meters (1,892 feet).

Gallagher (U.S.G.S.) (Medina County, H. Odessey, 1924).—About 28 miles by road northwest of San Antonio, 2½ miles west of the old Gallagher ranch house, one-fourth mile west of the west line fence of the Gallagher ranch property, and on the highest point of the highest hill in the vicinity, on land belonging to Charley Schott, who lives about 4 miles west of the station. Station is marked by tablet cemented in large boulder which projects 3 inches above ground. The United States Army engineers had a pole over this station during

the war. Reference mark is a standard reference disk in boulder, note 12 (b), 7.258 meters (23.81 feet) from station, in azimuth $305^{\circ}36'$. Reached by the Bandera Road from San Antonio, 24 miles to a small store and gasoline station on left side of road, and on west side of San Geronimo Creek. Ranch house is $1\frac{1}{2}$ miles southwest of Bandera Road. Elevation of station, 532.2 meters (1,746 feet).

Medina (Medina County, H. Odessey, 1924).—About 12 miles east of north from Castroville, 3 miles to the eastward from the Rio Medina post office, 150 meters (492 feet) north of road leading eastward from Rio Medina post office, on top of hill. The slopes of the hill are covered with mesquite trees and brush, with small brush on top of hill. Surface mark is iron pipe $2\frac{1}{2}$ feet long with screw top station mark. Underground mark is nail cemented in bedrock, note 7 (c). Station *Wurzbach* (U.S.G.S.) (see description thereof), marked by an iron pipe projecting 12 inches above the surface, is 6.366 meters (20.89 feet) from station, in azimuth $183^{\circ}48'$. Reached from San Antonio by the San Antonio-Del Rio Highway 24 miles to river bridge at Castroville, thence 9 miles to Rio Medina, thence east about 3 miles to crest of ridge with gate in fence on right, from which point the station is about 150 meters (492 feet) north on top of hill. Elevation of station, 349.2 meters (1,146 feet).

Peachtree (Medina County, H. Odessey, 1924).—About 20 miles north of Hondo, 10 miles direct or 15 miles by road west of south from Bandera, 3 miles west of the old Bandera-Hondo wagon road, 1 mile west of Peachtree water hole, on the highest hill in the vicinity, in Joe Short's pasture and about 75 meters (246 feet) west of the U.S.G.S. station of same name, which was marked with a tablet cemented in rock. Pieces of the old tripod were found but the mark was not recovered. Station was marked by a standard disk station mark countersunk in solid rock, note 3. Two reference marks were set, standard reference disks in bedrock, note 12 (b). No. 1 is 10.351 meters (33.96 feet) from station, in azimuth $280^{\circ}43'$; no. 2, 10.896 meters (35.75 feet), $29^{\circ}10'$. Station reached from Bandera south along the old Bandera-Hondo Road, to road leading to Peachtree water hole in Joe Short's pasture. There is a cultivated field northeast of the water hole and a corral about 250 meters (820 feet) east. Follow road on east side of field to corral, then take road leading southwestward around the east end of the hill; follow it for three-fourths mile, then turn off to right along a trail which has been cleared, and on which trucks can be driven to within three-fourths mile of station. From Hondo station may be reached by road to Burger (or Berger) ranch, which is 1 mile south of station and 2 miles southwest of Peachtree water hole. From Burger (or Berger) ranch follow Peachtree water hole road as above. Elevation of station, 502.1 meters (1,647 feet).

Schmidt (Medina County, H. Odessey, 1924).—About 10 miles east of Hondo, 10 miles by road west of Castroville, 2.5 miles north of Dunlay, a small station on the Southern Pacific and on the San Antonio-Del Rio Highway. Station is in E. H. Schmidt's pasture, about three-fourths mile south of his house, and about 200 meters (656 feet) southwest of the road leading from his house southward through his pasture to Dunlay. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is nail set in cement in bedrock. Station *Schmidt* (U.S.G.S.) (see description thereof), marked with a tablet set in a flat rock, is 6.290 meters (20.64 feet) from station, in azimuth $177^{\circ}58'$. *Schmidt astronomical station* is 9.18 meters (30.1 feet) from station, in azimuth $268^{\circ}52'$. Station reached by the San Antonio-Del Rio Highway to Dunlay, thence along lane north 1.2 miles to first road gate on left which leads into Schmidt's pasture, thence through pasture about 1 mile to trail leading to station. Elevation of station, 316.6 meters (1,039 feet).

Fohn (U.S.G.S.) (Medina County, H. Odessey, 1924).—About 10 miles southwest of Hondo, 7 miles southeast of D'Hanis, 1.5 miles west of Fohn's ranch house, on a brushy hill. Marked by an iron pipe set 40 inches in the ground and extending 10 inches above the surface. No additional marks were set. Reached from Hondo or D'Hanis by following highway 3.9 miles from railroad station at Hondo, or 5.1 miles from D'Hanis, to lane leading south, thence south to end of lane, there taking right-hand gate and road south along west side of fence. Pass through two more gates; the road then bears to southwest and leads to Fohn's ranch house. About 300 meters (984 feet) before ranch house is reached road turns off sharply to right and leads north and west around field; follow road about 1 mile to old road leading south, thence along old road

three-fourths mile, and then through brush to station. Elevation of station, 310.2 meters (1,018 feet).

Hackberry (Medina County, H. Odessey, 1924).—About 22 miles direct or 27 miles by road west of north from Hondo, 20 miles southwest of Bandera, 5 miles west of the Hondo Canyon Highway, 1 mile north of the old Bandera-Sabinal Road, and on a hill. Station marked by a standard disk station mark in solid rock, note 2 (a). Two reference marks were set, standard reference disks in rock, note 8 (a). No. 1 is 2.984 meters (9.79 feet) from station, in azimuth $168^{\circ}35'$; no. 2, 4.528 meters (14.86 feet), $249^{\circ}43'$. *Hackberry* (U.S.G.S.) (see description thereof) is 0.926 meter (3.04 feet) from station, in azimuth $296^{\circ}04'$. To reach from station *Peachtree* go south by the Berger (or Burger) ranch; about 2 miles south of that ranch take road leading west; follow this road west about 5 miles to Hondo Canyon Highway, then proceed north about 6 miles to the old Bandera-Sabinal Road. There are gates on the old road on east and west sides of highway, and a signboard: "22 miles to Hondo; 15 miles to Bandera; 24 miles to Utopia." Take the Utopia Road through pasture westward, and proceed about 4.5 miles to signal notice and telephone pole on left; from this point the station bears 296° magnetic. A truck trail was cleared 0.9 mile to base of hill; station was on top of hill, three-fourths mile further. Elevation of station, 602.7 meters (1,977 feet).

Crane (Uvalde County, H. Odessey, 1924).—About 15 miles direct or 19 miles by road north of Sabinal, 7 miles direct or 8 miles by road southeast of Utopia, $1\frac{1}{4}$ miles southwest of C. M. Donoho's ranch house, on the highest hill in the vicinity. Reached from station *Hackberry* by road westward to Miller ranch, on Big Seco Creek, thence westward to C. M. Donoho's ranch, thence by cleared trail through pasture to eastern end of hill, and up the hill one-half mile to the station. To reach from Sabinal take the Utopia Road 14 miles to Ed. Kelly's ranch, ranch house being about 200 meters to left of road. Pass through gate on right of road and follow road about 5 miles to C. M. Donoho's house. Road leads eastward for about 3 miles, then branches; take left-hand road leading north. Surface mark is an iron pipe with screw-cap station mark. Underground mark is a standard disk station mark in bedrock, note 8 (a). Reference mark is a standard reference disk in bedrock, note 12 (a). It is 3.030 meters (9.94 feet) from station, in azimuth $329^{\circ}09'$. Station *Crane* (U.S.G.S.) (see description thereof), marked by a copper bolt set in rock 10 inches below surface of ground, is 4.247 meters (13.93 feet) from station, in azimuth $83^{\circ}34'$. Azimuth from station to *Sabinal new water tank* is $359^{\circ}25'53''$. Elevation of station, 595.8 meters (1,955 feet).

Kennedy (Uvalde County, H. Odessey, 1924).—About 10 miles east of south from Sabinal, 3 miles east of the Sabinal-Frio Town Road, in the Kennedy pasture, about 3 miles southeast of the Kennedy ranch buildings, on the highest point in the vicinity, a hill well known locally as Irishman's Hill. Station *Irishman* (U.S.G.S.) (see description thereof) on the same hill, is marked with an iron pipe, and is 72.746 meters (238.67 feet) from station, in azimuth $269^{\circ}16'$. The hill is covered with brush 6 to 8 feet high which is very thick; about 5 miles northwest of the station is a smaller lone hill, rising from a plain, and much more noticeable than the station hill. Surface mark is an iron pipe with screw cap station mark. Underground mark is standard disk station mark in concrete, note 7 (a). Reached from Sabinal by the Frio Town Road south $7\frac{1}{2}$ miles to end of lane, thence east $1\frac{1}{4}$ miles to the Kennedy ranch buildings; pass through the stock lots, and follow road southeast about 3 miles through pasture to pen filled (in 1924) with beehives, which is about one-third mile northeast of the station. Going from the Kennedy ranch to the station follow the main traveled road about one-half mile, then take road to left at forks. Azimuth from station of *Sabinal new water tank*, is $161^{\circ}47'08''$. Elevation of station, 290.5 meters (953 feet).

Bald (Uvalde County, H. Odessey, 1924).—About 15 miles east of north from Knippa, a small town on the Southern Pacific, 17 miles west of north from Sabinal, and about $2\frac{1}{2}$ miles by trail northeast of Peter's ranch on Blanco Creek, on the highest hill in the vicinity, known locally as Bald Mountain. Top of hill has a few small cedar trees on it, and solid smooth outcrop of rock. Station *Peters* (U.S.G.S.) (see description thereof) is 2.00 meters (6.6 feet) from the station, in azimuth $13^{\circ}54'$. Station mark is a standard disk station mark in rock outcrop, note 2 (a). Reference mark is a standard reference disk in bedrock, note 12 (a), 4.31 meters (14.1 feet) from station, in azimuth $234^{\circ}54'$. Station may be reached from Sabinal by the Sabinal-Concan-Rio Frio-Leakey Road 12 miles to lane to right; follow lane north one-fourth mile to ranch house, thence northward

through pastures about 7 miles to Peter's ranch on Blanco Creek. From ranch go east about one-third mile to point of ridge just east of cultivated field, then follow ridge northeast to station. Top of ridge is open; there are two wire fences across top of ridge; station is about 300 meters (984 feet) to northward of second fence. From Knippa station reached by going north on graded road about 10 miles to Sabinal-Leakey Road, referred to above, thence westward 0.7 mile to road above described as leading to Peter's ranch. Station also reached by taking the Leakey Road about 6 miles, turning right into lane and following lane about 4 miles to J. E. Davenport's place; thence on Lone Tree Hollow Road to foot of hill, one-half mile from station. Elevation of station, 571.2 meters (1,874 feet).

Blue (Uvalde County, H. Odessey, 1924).—About 2 miles W. 15° N. from Knippa, a small town on the Southern Pacific, on a high round-topped volcanic hill, the highest hill in the vicinity, plainly seen from Knippa and vicinity. Surface mark is iron pipe $2\frac{1}{2}$ feet long with cap station mark, lower end of pipe surrounded with about 19 inches of concrete. Underground mark is standard disk station mark in concrete block, note 7 (a). Station *Blue Mountain* (U.S.G.S.) (see description thereof) is 20.296 meters (66.59 feet) from station in azimuth $272^{\circ}05'$ and azimuth of *Sabinal, new water tank* is $264^{\circ}47'29''$. In 1924 station reached from eastward by following highway to second iron bridge on Southern Pacific, 1 mile west of Knippa, there taking the road to right under east end of railroad bridge, and following it north 1.8 miles to first ranch buildings on left, passing through stock lots to west into lane, and following lane south and west to gate leading into pasture, across pasture, small field, etc., to base of hill, 20 minutes' walk, steep rough going, to station. Elevation of station, 386.5 meters (1,268 feet).

Cycamore (Uvalde County, H. Odessey, 1924).—About 20 miles, airline, and 27 miles by road northwest of Uvalde, $4\frac{1}{2}$ miles airline and 7 miles by road northwest of Laguna post office, about one-third mile east of Sycamore Creek, on the Landrum Ranch, on a high, bare, limestone hill, said to be the highest point in Uvalde County. Station is on highest point of east end of hill, and is marked by a standard disk station mark in solid rock, note 2 (a). Two reference marks were set, standard reference disks in bedrock, note 8 (a). No. 1 is 7.845 meters (25.74 feet) from station, in azimuth $244^{\circ}02'$; no. 2, 7.660 meters (25.13 feet), $183^{\circ}38'$. Station *Sycamore* (U.S.G.S.) (see description thereof), marked by a copper bolt set in rock, is 1.433 meters (4.70 feet) from station, in azimuth $195^{\circ}09'$. Station reached by the Rock Springs road north from Uvalde to Laguna post office, thence along highway 1.3 miles to northward to a well-traveled road to right, through board gate into pasture. Sign board on gate is marked "To Landrum's." Follow this road $1\frac{1}{4}$ miles to Mr. Landrum's house on north side of the Nueces River; from there take road northeast to Sycamore Creek, to windmill and ranch house. Stop about 100 meters (328 feet) southeast of windmill at bank of creek, from which point it is about one-half mile southeast to eastern end of hill. Elevation of station, 596.4 meters (1,957 feet).

Allen (Uvalde County, H. Odessey, 1924).—About 11 miles west of Uvalde, three-fourths mile to northward of the Uvalde-Del Rio State Highway No. 3, on the eastern end of the largest and highest hill in the vicinity. Surface mark is an iron pipe $2\frac{1}{2}$ feet long with screw-cap station mark, lower 10 inches of pipe set in concrete. Underground mark is standard station disk in concrete, note 7 (a). Station *Allen* (U.S.G.S.) (see description thereof), marked by iron pipe, is 2.655 meters (8.71 feet) from the station in azimuth $328^{\circ}31'$. Elevation of station, 394.5 meters (1,294 feet).

Cline (Kinney County, H. Odessey, 1924).—About 5 miles southwest of Cline railroad station on the Southern Pacific, on the eastern end of Anacacho Mountains, on the highest point of the spur between Frypan Valley and Mustang Canyon, in pasture belonging to Pingnot brothers, about 5 miles direct or 9 miles by road and trail southwest from their ranch house, where J. L. Pingnot, one of the brothers, lives. Station is about 120 meters (394 feet) northeast of the iron pipe marking station Cline (U.S.G.S.), and is marked with a standard disk station mark cemented in rock, note 2 (a). Two reference marks were set, standard reference disks in bedrock, note 12 (a). No. 1 is 20.905 meters (68.59 feet) from station, in azimuth $343^{\circ}27'$; no. 2, 22.920 meters (75.20 feet), $38^{\circ}50'$. Station reached by following the Uvalde-Del Rio State Highway No. 3 to J. L. Pingnot's house $1\frac{1}{4}$ miles southeast of Cline railroad station, and there taking a dim road west 200 meters (656 feet) passing through board gate and taking road to left. Follow all well-traveled roads to right to Pingnot's brothers' goat ranch, about 8.5 miles from house; drive up draw northeast about 250 meters (820 feet),

thence along good trail northward to top of ridge and along ridge northeastward 350 meters (1,148 feet) to station. Elevation of station, 459.4 meters (1,507 feet).

Moras (Kinney County, H. Odessey, 1924).—About 4 miles northeast of Brackettville, on the highest point of Las Moras Mountain, a well-known volcanic hill which can be plainly seen from Brackettville and vicinity. Surface mark is screw cap station mark on iron pipe 30 inches long, set 28 inches in ground, the lower half of the pipe encased in concrete with galvanized steel rod anchor near the bottom. Underground mark is standard disk station mark in concrete, note 7 (a). Twenty-four inches of bottom part of hole made for these marks is in soft limestone formation. Reference mark is a standard reference disk in rock, note 12 (a), stamped "Brackett, 1918", and placed 6.485 meters (21.28 feet) from station in azimuth 286°50'. (This distance is not in agreement with that in description for station *Brackett*.) Station *Las Moras* (U.S.G.S.) (see description thereof) is a screw cap mark on iron pipe, is marked "Moras 1924", and is 15.658 meters (51.37 feet) from station, in azimuth 9°02'. The cap had apparently been shot off by bullets. Rocks were piled around the pipe to protect it from further destruction. Station is probably within a few inches of the old station *Brackett*, a boulder being found at this point with cement on it and evidence that a station mark had been set in a crack in the boulder, which had been badly shattered, as if by bullets. From Brackettville take road north, and follow it to a lane which leads eastward, on north side of hill. This is about one-half mile from station. Elevation of station, 510.6 meters (1,675 feet).

Anacacho (Kinney County, H. Odessey, 1924).—About 1 mile southeast of the station board at Anacacho railroad station, on the Southern Pacific, and 1¼ miles, S. 27° E. (mag.) from the section house, on the highest hill in the vicinity. Station marked by a standard disk station mark set in solid rock, note 2 (a). Two reference marks were set, standard reference disks in bedrock, note 8 (a). No. 1 is 16.396 meters (53.79 feet) from station, in azimuth 242°55'; no. 2, 13.413 meters (44.01 feet), 308°27'. Station *Anacacho* (U.S.G.S.) (see description thereof), marked by a copper bolt set in solid rock, is 6.585 meters (21.60 feet) from the station, in azimuth 31°27'. In 1924 station was reached from Anacacho railroad station by picking up road leading southeast about 150 meters (492 feet) to westward of station board, following this road about one-fourth mile, turning right and driving around east end of first high ridge, and up the first canyon. Station is on first high hill to southward of canyon. Elevation of station, 406.2 meters (1,333 feet).

Supplementary points

Miller (U.S.G.S.) (Bexar County, H. Odessey, 1924).—An iron pipe, 3.071 meters (10.08 feet) in azimuth 248°31' from station *Miller* (see description thereof).

Bulverde (U.S.E.) (Bexar County, H. Odessey, 1924).—A marked but not described point, 0.130 meter (0.43 foot) in azimuth 70°17' from station *Bulverde* (see description thereof).

Smith (U.S.G.S.) (Bexar County, H. Odessey, 1924).—Standard tablet of United States Geological Survey, one side broken off, on same rock as station *Smith* (see description thereof) and 0.155 meter (0.51 foot) from that station in azimuth 5°13'.

Wurzbach (U.S.G.S.) (Medina County, H. Odessey, 1924).—An iron pipe projecting 12 inches above ground, and 6.366 meters (20.89 feet) in azimuth 183°48' from station *Medina* (see description thereof).

Schmidt (U.S.G.S.) (Medina County, H. Odessey, 1924).—Standard tablet of the United States Geological Survey in a flat rock, 6.290 meters (20.64 feet) in azimuth 177°58' from station *Schmidt* (see description thereof).

Hondo (Medina County, H. Odessey, 1924).—About 1.5 miles east of Hondo, a town on the Southern Pacific, at milepost 257, about 15 meters (49 feet) south of the track, about 10 meters (33 feet) east of road crossing, and near the southwest corner of the right-of-way fence. Station marked by standard disk station mark set in concrete, note 1 (a). *B. M. C 35* (see description thereof) is 9.895 meters (32.46 feet) from station in azimuth 270°04'. The azimuth from station of *Hondo water tank* is 82°29'09"; and of *Hondo courthouse tower*, 94°17'48". Elevation of station, 268.90 meters (882.2 feet).

For notes in regard to marking of stations see p. 154.

B. M. C 35 (Medina County, H. Odessey, 1924).—Station is bottom of a square hole in top of stone post, lettered "U S B M", 9.895 meters (32.46 feet) in azimuth $270^{\circ}04'$ from station *Hondo* (see description thereof). Elevation of station is 268.909 meters (882.246 feet).

Hackberry (U.S.G.S.) (Medina County, H. Odessey, 1924).—Copper bolt 0.926 meter (3.04 feet) in azimuth $296^{\circ}04''$ from station *Hackberry* (see description thereof).

Crane (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—Copper bolt leaded into solid limestone rock about 10 inches below surface of ground, 4.247 meters (13.93 feet) in azimuth $83^{\circ}34'$ from station *Crane* (see description thereof). Reference mark consists of an arrow cut in rock 15.69 feet southwest of station.

Irishman (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—An iron pipe, 72.746 meters (238.67 feet) in azimuth $269^{\circ}16'$ from station *Kennedy* (see description thereof). Reference mark consists of quart bottle buried 8 inches below surface of ground and covered by a mound of stone, 7.88 feet from station.

Peters (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—Copper bolt cemented with sulphur in limestone rock, 2.00 meters (6.6 feet) in azimuth $13^{\circ}54'$ from station *Bald* (see description thereof). A reference mark consisting of an arrow cut in flat limestone is 19.9 feet from station in azimuth $182^{\circ}06'$.

Blue Mountain (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—Copper bolt cemented between several large rocks, 20.296 meters (66.59 feet) in azimuth $272^{\circ}05'$ from station *Blue* (see description thereof).

Sycamore (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—Copper bolt in rock 1.433 meters (4.70 feet) in azimuth $195^{\circ}09'$ from station *Cycamore* (see description thereof).

Allen (U.S.G.S.) (Uvalde County, H. Odessey, 1924).—Iron pipe 2.655 meters (8.71 feet) in azimuth $328^{\circ}31'$ from station *Allen* (see description thereof).

B.M. I 32 (Kinney County, H. Odessey, 1924).—About 2 miles south of Spofford, on the right-of-way of the Spofford-Eagle Pass branch of the Southern Pacific at milepost 2, and 49 feet east of the track. Marked by a brass disk in concrete post. Tablet stamped "I 32 1917 978.86." Elevation of station, 298.392 meters (978.974 feet).

Las Moras (U.S.G.S.) (Kinney County, H. Odessey, 1924).—Screw cap mark on iron pipe, 15.658 meters (51.37 feet) in azimuth $9^{\circ}02'$ from station *Moras* (see description thereof).

Anacacho (U.S.G.S.) (Kinney County, H. Odessey, 1924).—Copper bolt in solid rock 6.585 meters (21.60 feet) in azimuth $31^{\circ}27'$ from station *Anacacho* (see description thereof).

RED RIVER BOUNDARY ARC

Principal points

Keele (Jefferson County, Okla., E. O. Heaton, 1923).—About 3 miles west and $4\frac{1}{2}$ miles south of town of Waurika, at east side of roadway on section line between sections 23 and 29, about one-third mile south of the northwest corner of sec. 28, T. 5 S., R. 8 W., and about 60 meters (197 feet) due east from J. W. Keele's farmhouse. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in the southeast corner of Keele's yard, and 21.06 meters (69.1 feet) from station, in azimuth $63^{\circ}38'$. Elevation of station, 310.4 meters (1,018 feet).

Hastings (Jefferson County, Okla., E. O. Heaton, 1923).—About 8 miles west and $1\frac{1}{2}$ miles north of Waurika, 3 miles south and 1 mile west of the town of Hastings, one-half mile east of the Jefferson-Cotton County line, in the northeast corner of SW $\frac{1}{4}$ sec. 27, T. 4 S., R. 9 W., on land belonging to W. J. Johnson, and rented by Bill Hall, on the east end of a rather prominent ridge and about 600 meters (1,968 feet) north of Hall's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), in fence line, 174.27 meters (571.8 feet) from station, in azimuth $8^{\circ}48'36''$. Elevation of station, 312.8 meters (1,026 feet).

Byers (Clay County, E. O. Heaton, 1923).—One and one-half miles southwest of the town of Byers, 200 meters (656 feet) west of the Byers-Wichita Falls highway, 225 meters (738 feet) west of the Wichita Valley Railroad, and about 40 meters (131 feet) north of a road running east and west, on the highest point of land in the vicinity. Land belongs to G. W. Byers, who lives about one-half

mile north of the town of Byers. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), set in fence line at south edge of road, 67.28 meters (220.7 feet) from station, in azimuth $317^{\circ}37'$. Elevation of station, 318.5 meters (1,045 feet).

Lee (Cotton County, Okla., E. O. Heaton, 1923).—Five miles east and 1 mile north of Randlett, 3 miles west and 1 mile north of Taylor, in the NE $\frac{1}{4}$ sec. 30, T. 4 S., R. 11 W., 175 meters (574 feet) west of road, on land belonging to J. R. Lee, 30 meters (98 feet) south and one-half meter (2 feet) east of southeast corner of his house. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference mark is a brass bolt with arrow cut in it, set in concrete, in corner of fence, 163.83 meters (537.5 feet) from station, in azimuth $279^{\circ}42'55''$. Elevation of station, 319.8 meters (1,049 feet).

Bailer (Cotton County, Okla., E. O. Heaton, 1923).—About 8 miles east and $1\frac{1}{2}$ miles south of Randlett, 7 miles south and 5 miles west of Temple, $1\frac{1}{2}$ miles south and one-half mile east of Taylor. Blacksmith shop and store at crossroads. In SW $\frac{1}{4}$ sec. 2, T. 5 S., R. 11 W., on the north bluff of the Red River, on excess land about 2.5 meters (8 feet) south of fence at south side of property belonging to J. A. Bailey, and one-half mile southeast of his house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), in corner of fence near Bailey's house, and 515.23 meters (1,690.4 feet) from station, in azimuth $115^{\circ}48'16''$. Elevation of station, 313.6 meters (1,029 feet).

Thornberry (Wichita County, E. O. Heaton, 1923).—About 12 miles by road east of Burkburnett, 6 miles northeast of Freeburg Church and School, 1 mile west of the Thornberry Church and School, one-fourth mile north of graded highway leading from Thornberry to Freeburg School and Wichita Falls, and 150 meters (492 feet) east of a north-and-south road. It is about 150 meters (492 feet) west and 35 meters (115 feet) north of the only oil derrick in the vicinity, and a few meters northwest of the northernmost of 2 tanks used to supply water to boilers for use with the derrick. Surface and underground marks are recorded as being standard disk station marks in concrete, notes 1 (a) and 7 (a), but an additional note records standard surface mark being in concrete 18 inches below surface of ground. Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is at north side of graveled highway, and 468.05 meters (1,535.6 feet) from station, in azimuth $3^{\circ}12'09''$. No. 2 is in fence line at east side of road, 144.02 meters (472.5 feet) from station, in azimuth $86^{\circ}41'59''$. Elevation of station, 319.9 meters (1,050 feet).

Willis (Cotton County, Okla., E. O. Heaton, 1923).—Five and one-half miles south and $1\frac{1}{2}$ miles west of Randlett, on highest point of the bluff on north bank of Red River, in SE $\frac{1}{4}$ sec. 30, T. 5 S., R. 12 W., on excess land claimed by A. L. Willis, about one-half mile nearly due west of his house, about 25 feet southwest of the corner of fence along top of bluff at point where the fence from the south makes a turn of 90° to west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed at intersection of fences, and 124.50 meters (408.5 feet) from station, in azimuth $169^{\circ}23'54''$. Elevation of station, 338.0 meters (1,109 feet).

Gammill (Cotton County, Okla., E. O. Heaton, 1923).—Three miles west of Randlett, 4 miles east and one-half mile south of Devoil, on east side of roadway, between secs. 25 and 26, T. 4 S., R. 13 W., 120 meters (394 feet) south of the quarter-section corner, about 40 meters (131 feet) northwest of C. B. Gammill's house, 7 feet west of the east fence line of roadway, and 10 feet northwest of northwest corner of Gammill's yard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed at quarter-section corner, on west side of road, and 121.02 meters (397.0 feet) from station, in azimuth $173^{\circ}51'38''$. Elevation of station, 333.4 meters (1,094 feet).

Cashion (Wichita County, E. O. Heaton, 1923).—About 7 miles north of Wichita Falls, 6 miles southeast of Burkburnett and 1 mile south of the Cashion schoolhouse, on the highest point of the ridge, 9 meters (30 feet) west of the Burkburnett-Wichita Falls concrete highway and about 15 meters (49 feet) north of a house which is on the east side of the road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark no. 1 is a standard reference disk in concrete, note 11 (a), placed in a fence corner on east side of road, 54.35 meters (178.3 feet) from station, in azimuth

339°59'. Reference mark no. 2 is not described, but is probably a disk reference mark, being set in the concrete highway about 2½ feet east of the west edge of the concrete, 20.72 meters (68.0 feet) from the station, in azimuth 340°10'. Elevation of station, 324.6 meters (1,065 feet).

Sullivan (Wichita County, E. O. Heaton, 1923).—About 2 miles west of Burkburnett, 75 meters (246 feet) north of the concrete highway (Electra road), on land belonging to Mr. J. Sullivan, and 200 meters (656 feet) west of his house. Station *Sullivan* (*U.S.G.S.*), established in 1914, marked by iron pipe, is 23.700 meters (77.76 feet) from station, in azimuth 289°18'. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set. No. 1 is a standard reference disk in concrete, note 11 (a), in fence line, and 72.766 meters (238.73 feet) from station, in azimuth 1°39'. No. 2 is a standard reference disk set in the pavement about 3 feet from north edge, and 80.611 meters (264.47 feet) from station, in azimuth 1°41'. Elevation of station, 342.2 meters (1,123 feet).

Miller (Cotton County, Okla., E. O. Heaton, 1923).—One mile east and 2 miles south of Devol, in the SW¼SW¼ sec. 33, T. 4 S., R. 13 W., on land belonging to Mrs. Jake Miller, whose house is about 300 meters (984 feet) to the northward. Station is about 250 meters (820 feet) northeast of southwest corner of sec. 33, about 100 meters (328 feet) east of the west section line, and about 250 meters (820 feet) southeast of the most southeasterly one of several oil storage tanks, and is on the highest knoll in the vicinity overlooking the Red River to the southward. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in the east fence line of sec. 33, and 116.68 meters (382.8 feet) from station, in azimuth 85°50'04". Elevation of station, 335.1 meters (1,099 feet).

Grandfield (Tillman County, Okla., E. O. Heaton, 1923).—About one-half mile south of the town of Grandfield, on west side of the highway leading to the Grandfield bridge over the Red River, about 18 inches east of the road fence near the east side center of the SW¼ sec. 18, T. 4 S., R. 14 W., and directly west of a large red barn on east side of the road on the Mat Hubbard farm. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), in east fence of roadway, 19.270 meters (63.22 feet) from station, in azimuth 264°32'. Elevation of station, 351.2 meters (1,152 feet).

Sunshine (Wichita County, E. O. Heaton, 1923).—About 12½ miles southwest of Burkburnett, about 40 meters (131 feet) southeast of the Sunshine schoolhouse, in an enclosed lot on the property of the Sanders estate (W. C. Witcher, guardian). Station is 8 meters (26 feet) south of north fence line, 25 meters (82 feet) west of east fence line of lot, and 12.5 meters (41 feet) northwest of water storage tank. Station *Sunshine* (*U.S.G.S.*), established in 1914 (see description thereof), marked by iron pipe, is 5.086 meters (16.69 feet) from station, in azimuth 234°27'. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 1 foot west and 4½ feet south of the southwest corner of the schoolhouse, and 37.725 meters (123.77 feet) from station, in azimuth 123°22'. Elevation of station 367.7 meters (1,206 feet).

Tipton (Tillman County, Okla., E. O. Heaton, 1923).—About 5 miles west and 5 miles south of the railroad depot at Grandfield, in the NW¼ sec. 3, T. 5 S., R. 15 W., on the most northerly and highest sand hill in the vicinity, about 60 meters (197 feet) east of roadway on west section line, on land belonging to Mr. Pharis and in charge of Mr. Tipton, who lives about one-third mile northwest of the station in the northeast corner of sec. 4. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in east fence line of roadway, and 152.64 meters (500.8 feet) from station, in azimuth 93°50'01". Elevation of station, 353.7 meters (1,160 feet).

Burke (Tillman County, Okla., E. O. Heaton, 1923).—About 8 miles west and 1¼ miles south of the railway depot in Grandfield, in SE¼ sec. 14, T. 4 S., R. 16 W., on the highest ground in H. L. Burke's yard, midway between his house and barn. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in fence corner at west side of road, and 56.590 meters (185.7 feet) from station, in azimuth 297°10'. Elevation of station, 362.4 meters (1,189 feet).

Harrold (Wilbarger County, E. O. Heaton, 1923).—One mile east and 1 mile north of the town of Harrold, on east side of roadway, 8 meters (26 feet) from center line, on land belonging to P. Vaughn, who lives about one-half mile to eastward, and about 25 meters (82 feet) north and 15 meters (49 feet) west of a house which is vacant at intervals. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Reference mark is a standard reference disk in concrete, note 11 (*a*), placed 1½ feet west of the west fence line of roadway, and 15.409 meters (50.55 feet) from station, in azimuth 76°09'. Elevation of station, 383.1 meters (1,257 feet).

Hickerson (Tillman County, Okla., E. O. Heaton, 1923).—Fifteen miles due west of Grandfield, in NE¼ sec. 11, T. 4 S., R. 17 W., on land owned by C. V. Hickerson and occupied by Glen Wallis, in a small pasture about 300 meters (984 feet) south of Wallis' house, 20 meters (66 feet) north of south fence line and 45 meters (148 feet) west of east fence line of pasture. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Reference mark is standard reference disk in concrete, note 11 (*a*), 8 meters (26 feet) south of center line of road, 25 meters (82 feet) west of Wallis' house, and 299.53 meters (982.7 feet) from station, in azimuth 179°28'57". Elevation of station, 366.1 meters (1,201 feet).

Red Bluff (Wilbarger County, E. O. Heaton, 1923).—About 8 miles by road northeast of the town of Vernon, 1½ miles east of the Hinds schoolhouse (known locally as the new schoolhouse), on the highest and most northerly point of Red Bluff overlooking the Red River at the bend of the river 3 miles above the mouth of the Pease River, where after flowing down from the northwest for a distance of 25 miles, it turns to eastward for a distance of 15 miles. Red Bluff is a well known point in this vicinity, and the land on which the station is located is owned by a Mr. Allison and occupied by W. L. Hendricks, who lives about three-fourths of a mile west of station. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Azimuth to *Vernon city water tank* is 48°00'42". Elevation of station, 391.3 meters (1,284 feet).

Frederick (Tillman County, Okla., E. O. Heaton, 1923; 1927).—On ridge just north of town of Frederick in prolongation of Fifth Street, on property leased by Mr. Frank Thompson, about 175 meters (574 feet) northwest of his house, and 8 feet east of the west fence line leading north from his barn. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Reference mark is standard reference disk in concrete, note 11 (*a*), placed in fence line about 18 meters (59 feet) north of house, 1½ feet east of west edge of same, and 142.805 meters (468.52 feet) from station in azimuth 350°09'33". Elevation of station, 419.2 meters (1,375 feet).

Harrison (Wilbarger County, E. O. Heaton, 1923).—About 11 miles north of the town of Vernon, about 6 miles east and 5 miles south of Odell, and 2 miles north of the D. L. Green farm, a farm having buildings and 2 large silos on east side of road. Station is 85 meters (279 feet) east of road leading north from the Green farm, on the most northerly high hill of a range of sand hills, on land belonging to J. S. Harrison who lives 1 mile to the east. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Reference mark is standard reference disk in concrete, note 11 (*a*), placed in east fence line of roadway, 73.15 meters (240.0 feet) from station, in azimuth 71°55'. Elevation of station, 438.8 meters (1,440 feet).

Cunningham (Tillman County, Okla., E. O. Heaton, 1923).—About 4 miles west and 1 mile north of Frederick, 6½ miles south and 2½ miles east of Tipton, seven-eighths of a mile south of the Bethel Church, at east side of roadway, 3 feet west of fence line along west side of sec. 4, T. 2 S., R. 18 W., 200 meters (656 feet) north of the southwest corner of said section, about one-fourth mile west of the home of A. C. Cunningham, and in line with the center line of roadway leading out from house on farm of Robert Cole. Surface and underground marks are standard disk station marks in concrete, notes 1 (*a*) and 7 (*a*). Reference mark is standard reference disk in concrete, note 11 (*a*), at west edge of road, and 16.542 meters (54.27 feet) from station, in azimuth 125°44'. Elevation of station, 417.6 meters (1,370 feet).

Hess (Jackson County, Okla., E. O. Heaton, 1923).—About 3 miles east and one-half mile south of the town of Elmer, 1 mile west and one-half mile north of Hess, in the SW¼ NW¼ sec. 15, T. 1 S., R. 20 W. on land owned by C. A. Baker, and occupied by C. L. Lovett, on the highest point in a cultivated field about 175 meters (574 feet) N. 25° W. of Lovett's house, 190 meters (623 feet) north of the east-and-west wagon road on the half section line, and 140 meters (459 feet)

east of a north-and-south road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 a. No. 1 is 1 foot north of the south fence line of roadway, and 201.38 meters (660.7 feet) from station, in azimuth $359^{\circ}26'34''$. No. 2 is at east edge of roadway, and 146.11 meters (479.4 feet) from station, in azimuth $92^{\circ}46'37''$. Elevation of station, 427.7 meters (1,403 feet).

Butte (Jackson County, Okla., E. O. Heaton, 1923).—About 9 miles east and 1 mile north of Eldorado, near east side center of sec. 9, T. 1 S., R. 22 W., near the north end of a flat-topped butte, which is 200 meters (656 feet) long in a north-and-south direction and 70 meters (230 feet) wide, and about 350 meters (1,148 feet) northwest of a round-topped butte which is the farthest southeast of all the buttes. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in rock outcrop, note 12 (a). No. 1 is 17.87 meters (58.6 feet) from station, in azimuth $293^{\circ}00'$. No. 2, 22.41 meters (73.5 feet), $149^{\circ}51'$. Elevation of station, 455.0 meters (1,493 feet).

Whittle (Hardeman County, E. O. Heaton, 1923).—About $7\frac{1}{2}$ miles north of Chillicothe, 7 miles west of Odell, and 3 miles north of the Whittle Chapel schoolhouse, on land owned by Mrs. S. B. Smith and occupied by Mr. B. M. Brown. Station is about 250 meters (820 feet) southeast of Brown's house, and on a prominent sand hill which is covered with bushes and sage brush. A small tree with flat top stands on the peak of the hill, and is 6.5 meters (21 feet) southeast of the station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), placed 4.4 meters (14 feet) east of the road, 9.94 meters (32.6 feet) southwest of the southwest corner of Brown's house, and 262.36 meters (860.8 feet) from the station, in azimuth $101^{\circ}51'32''$. Elevation of station, 474.8 meters (1,558 feet).

Green (Hardeman County, E. O. Heaton, 1923).—About 6 miles north of the town of Quanah, 2 miles south of the Quanah-Eldorado highway bridge over the Red River, one-fourth mile west of that highway, on land belonging to Walter Green, 37.84 meters (124.1 feet) northeast of the northeast corner of his house, 5 meters (16 feet) east and 5.5 meters (18 feet) north of his windmill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 379.89 meters (1,246.4 feet) from station, in azimuth $240^{\circ}04'16''$. It is in the west fence line of the railroad right-of-way, 14.20 meters (46.6 feet) west of the west rail, and at north side of gate for road leading to Mr. Green's house. Elevation of station, 473.7 meters (1,554 feet).

Eldorado (Jackson County, Okla., E. O. Heaton, 1923).—About three-fourths mile north and $2\frac{1}{2}$ miles east of the depot at the town of Eldorado, near the east side center of $SE\frac{1}{4}$ sec. 9, T. 1 S., R. 23 W., on highest ground at east side of pasture owned by Joe Wilson, one-third mile northeast of his house, and 32 meters (105 feet) west of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in fence line at west edge of roadway, and 25.128 meters (82.44 feet) from station, in azimuth $247^{\circ}16'$. Elevation of station, 463.0 meters (1,519 feet).

Campbell (Harmon County, Okla., E. O. Heaton, 1923).—About 10 miles west and 4 miles north of Eldorado, in fence line on north side of roadway, at south side of $SE\frac{1}{4}$ sec. 21, T. 1 N., R. 25 W., on land belonging to C. M. Campbell, who owns the land on both sides of the roadway, and lives about 200 meters (656 feet) east of station at southeast corner of sec. 21. Station is about 1 mile east of Red River and commands a good view of it from southwest to northwest. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), in fence line at south side of roadway, and 107.99 meters (354.3 feet) from station, in azimuth $274^{\circ}55'50''$. Elevation of station, 487.7 meters (1,600 feet).

Gould (Harmon County, Okla., E. O. Heaton, 1923).—About one-half mile northeast of the town of Gould, in the $NE\frac{1}{4}$ sec. 6, T. 2 N., R. 24 W., on land belonging to J. E. Willingham, who lives about one-half mile west of the station in the first house north of the railroad track and about 100 meters (328 feet) east of the highway. Station is on highest point on the extreme southern end of a ridge with bluff on south and east sides, and is 54 meters (177 feet) east of the north-and-south fence line at point where this fence line turns southwest. Surface and underground marks are standard disk station marks in concrete,

notes 1 (a) and 7 (a). Reference mark no. 1 is a standard reference disk in outcropping bedrock, note 12 (a), 35.15 meters (115.3 feet) from station, in azimuth $2^{\circ}30'$. No. 2 is a standard reference disk in concrete, note 11 (a), in fence line, 167.12 meters (548.3 feet) from station, in azimuth $116^{\circ}55'46''$. Elevation of station, 510.8 meters (1,676 feet).

Hollis (Harmon County, Okla., E. O. Heaton, 1923).—One and one-half miles west and $3\frac{1}{4}$ miles south of Hollis, on east side of roadway, near west side center of SW $\frac{1}{4}$ sec. 21, T. 2 N., R. 26 W., across the road from house of L. R. Campbell. Station is 8 feet west of east fence line of roadway, about 75 meters (246 feet) east and 15 meters (49 feet) north of Campbell's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), in west fence line of roadway, and 51.465 meters (168.85 feet) from station, in azimuth $164^{\circ}47'$. Elevation of station, 525.6 meters (1,724 feet).

Snider (Harmon County, Okla., E. O. Heaton, 1923).—About 12 miles west and 6 miles north of the town of Eldorado, in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 17, T. 1 N., R. 25 W., on land owned by G. W. Snider, and occupied by E. S. Johnson, on the north bluff of the Red River, about one-third mile northwest of Johnson's house, in bluff pasture land just south of a cultivated field, and about 5 feet south of a wire fence which runs along the south side of road leading from Johnson's house. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark; no reference mark. Azimuth from station of *Louis high school cupola*, about $2\frac{1}{2}$ miles distant, is $259^{\circ}28'07''$. Elevation of station, 493.0 meters (1,617 feet).

Day (Harmon County, Okla., E. O. Heaton, 1923).—Three and one half miles east and 7 miles north of Hollis, on the north side of the roadway, on south side of the SE $\frac{1}{4}$ sec. 29, T. 4 N., R. 25 W., on land belonging to William Day, 120 meters (394 feet) west of his house (magnetic bearing of house from station being 75°), and about 125 meters (410 feet) east of southwest corner of the quarter section. Mr. Day's windmill is 112 meters (367 feet) from station on magnetic bearing 80° . Station is on small sand ridge which is covered with small live oak brush. Sand drifts badly and may cover station in short time. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed due south of Day's house, and 120.895 meters (396.64 feet) from station, in azimuth $281^{\circ}28'04''$. Elevation of station, 571.7 meters (1,876 feet).

Henry (Harmon County, Okla., E. O. Heaton, 1923).—Four miles west and 8 miles north of the town of Hollis, $1\frac{1}{4}$ miles east of the old State line, in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 30, T. 4 N., R. 26 W., on land owned by A. B. Henry, one-half mile southwest of his house, on the northernmost of two small peaks on a sand ridge in the southwest side of Henry's pasture, and 100 meters (328 feet) east of the west section line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), in fence line along west side of section, and 102.03 meters (334.7 feet) from station, in azimuth $98^{\circ}21'$. Elevation of station, 603.3 meters (1,979 feet).

Supplementary points

Ryan, city water tank (Jefferson County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Waurika, city water tank (Jefferson County, Okla., E. O. Heaton, 1923).—A large black tower tank to the rear of the Rock Island railway depot.

Byers, city water tank (Clay County, E. O. Heaton, 1923).—A large, gray-colored tower tank at east edge of town.

Hastings, city water tank (Jefferson County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Temple, city water tank (Cotton County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Petrolia, high school cupola (Clay County, Okla., E. O. Heaton, 1923).—High school at Petrolia, near east edge of town.

Walters, city water tank (Cotton County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Iowa Park, city water tank (Wichita County, E. O. Heaton, 1923).—A large black tower tank near east side of town.

Wichita Falls, City Power & Electric Co., stack (Wichita County, E. O. Heaton, 1923).—The large concrete stack of the City Power & Electric Co., near south edge of town.

Wichita Falls, State hospital water tank (Wichita or Archer County, E. O. Heaton, 1923).—A large black tower tank at the State hospital about 5 miles south of Wichita Falls.

Wichita Falls, Call aviation field, water tank (Wichita or Archer County, E. O. Heaton, 1923).—Water tank at Call aviation field, about 5 miles southwest of Wichita Falls.

Burkburnett, city water tank (Wichita County, E. O. Heaton, 1923).—A large black tower tank near the center of town.

Devol, city water tank (Cotton County, Okla., E. O. Heaton, 1923).—A large black tower tank near the center of town.

Sunshine (U.S.G.S.) (Wichita County, E. O. Heaton, 1923).—Station established by United States Geological Survey in 1914, and marked by iron pipe and bronze cap, 5.086 meters (16.69 feet) in azimuth $234^{\circ}27'$ from station *Sunshine* (see description thereof). Elevation of station, 368 meters (1,207 feet.)

Sullivan (U.S.G.S.) (Wichita County, E. O. Heaton, 1923).—Station established in 1914 by United States Geological Survey, and marked by an iron pipe, 23.700 meters (77.76 feet) in azimuth $289^{\circ}18'$ from station *Sullivan* (see description thereof). Elevation of station, 332 meters (1,089 feet.)

Grandfield, city water tank (Tillman County, Okla., E. O. Heaton, 1923).—A large black tower tank in south edge of town.

Grandfield, city high school (Tillman County, Okla., E. O. Heaton, 1923).—A large square building with cupola near central part of town.

Chattanooga, city water tank (Comanche County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Electra, city water tank (Wichita County, E. O. Heaton, 1923).—A large black tower tank.

Vernon, city water tank (Wilbarger County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Frederick, city water tank (Tillman County, Okla., E. O. Heaton, 1923).—A large black tower tank near west edge of town.

Olustee, city water tank (Jackson County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Altus, city water tank (Jackson County, Okla., E. O. Heaton, 1923).—A large black tower tank.

Eldorado, United States Gypsum Co., water tank (Jackson County, Okla., E. O. Heaton, 1923).—A large black tower tank 1 mile north of town.

Louis, high school cupola (Harmon County, Okla., E. O. Heaton, 1923).—A square frame building with cupola.

Gould, high school, north chimney (Harmon County, Okla., E. O. Heaton, 1923).—A large red brick building at southeast edge of town.

Hollis, city water tank (Harmon County, Okla., E. O. Heaton, 1923).—A large black tower tank at southeast edge of town.

Quanah, courthouse cupola (Hardeman County, E. O. Heaton, 1923).—The courthouse of Hardeman County, in the central part of the town of Quanah.

Quanah, city water tank (Hardeman County, E. O. Heaton, 1923).—A large black tower tank.

Herg (Hardeman County, E. O. Heaton, 1923).—About 6 miles east of Kirkland, one-fourth mile east of the section house at Herg railway station, 40 paces north of the Fort Worth & Denver City Railway track, on north side of highway, 60 paces west of gate leading into a stock lot having tank and windmill which is on the property of a Mr. McCreary. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), placed in the north fence line of the roadway, 45.21 meters (148.3 feet) from station, in azimuth $96^{\circ}29'$. Elevation of station, 506 meters (1,660 feet).¹

Hardeman (Hardeman County, E. O. Heaton, 1923).—About $3\frac{1}{2}$ miles east of the town of Kirkland, 117.2 meters (385 feet) northeast of the Hardeman-Childress Counties signboard, 84.2 meters (276 feet) north of the north rail of the Fort Worth & Denver City Railway, 60 meters (197 feet) north of the center of the highway, on the north end of a small uncultivated hill of shell rock. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Concrete line post of Hardeman-Childress Counties was used as a reference mark. It is 2 feet south of the south fence of roadway, and 117.90 meters (386.8 feet) from station, in azimuth $76^{\circ}11'$. Elevation of station, 501 meters (1,644 feet).¹

¹ No check on this elevation.

Elroy (Hardeman County, E. O. Heaton, 1923).—About 7 miles north and 6 miles east of the town of Kirkland, 2 miles south of the Hooleyann store, on land belonging to W. H. Jenkins. Station is on highest point in a cultivated field, about one-fourth mile southeast of a house occupied by a Mr McElroy, 132 meters (433 feet) west of a north-and-south fence line, and 107 meters (351 feet) north of section line fence. No surface mark was set because of interference with cultivation of field. Station mark set 18 inches below surface of ground is a standard disk station mark in concrete, note 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), set in fence line, 114.24 meters (374.8 feet) from station in azimuth $282^{\circ}35'37''$. Elevation of station, 555.4 meters (1,822 feet).

Red River longitude (Childress County, E. O. Heaton, 1923).—About 3 miles east of Kirkland, one-fourth mile north of the Fort Worth & Denver City Railway, one-fourth mile north of the Quanah-Childress highway, on land belonging to H. M. Thomas, in a small cultivated field about 100 meters (328 feet) northeast of his house. Station marked by a concrete pier, the lower base of which is 24 by 30 inches set 30 inches in ground on solid rock. The upper part of pier is 18 by 24 inches and extends 30 inches above the surface of ground. Elevation of station is 1,611.2 feet. A point on the old meridian boundary between Childress and Hardeman counties, marked by a sandstone 10 by 18 inches above ground, with letters "CC" on west face and "HC" on east face, bears S. $77^{\circ}24'$ E., and is distant 2,610 feet. This station was established astronomically in 1902 by the General Land Office. Elevation of station, 491 meters (1,611 feet).¹

Initial (Childress County, E. O. Heaton, 1923).—On the old State line, about one-fourth mile north of the Red River, $5\frac{1}{2}$ miles west and 7 miles south of the town of Hollis, on land owned by Frank Closky, about three-fourths mile west of his house, 2.3 meters (8 feet) north of Initial Point of the Jones and Brown survey of 1858, and 5.5 meters (18 feet) east of a north-and-south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). There are no reference marks. *Texas-Oklahoma old boundary and T. 1 N., R. 27 W., secs. 2/11, corner*, marked by gray stone with cross cut in top, is 206.87 meters (678.7 feet) from station in azimuth $179^{\circ}47'14''$. Elevation of station, 496 meters (1,627 feet).

Closky (Childress County, E. O. Heaton, 1923).—About $4\frac{3}{4}$ miles west and 7 miles south of Hollis, about 25 meters (82 feet) south of north line of sec. 11, T. 1 N., R. 27 W., of the Oklahoma land survey, in pasture lot of Frank Closky. Station is about 75 meters (246 feet) northeast of his house, and 20 meters (66 feet) east of road leading to it. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a). Following distances and azimuths are from station: Station *Initial* (see description thereof), 0.7 mile, $79^{\circ}36'40''$; *Kidder monument (1902)* (see description thereof) 204.9 meters (672 feet), $348^{\circ}28'07''$. Elevation of station, 487 meters (1,598 feet).¹

Kidder monument (1902) (Childress County, E. O. Heaton, 1923).—About $4\frac{3}{4}$ miles west and 7 miles south of Hollis, about 120 meters (394 feet) southeast of Frank Closky's house, in north side of cultivated field just south of his pasture. Station marked by stone post 10 by 14 by 45 inches projecting 18 inches above surface of ground. In 1923 a standard disk station mark was set in center of top of stone and stamped "Kidder 1902." Monument was established in 1902 by the General Land Office. Following distances and azimuths are from station: Station *Closky* (see description thereof), 204.9 meters (672 feet), $168^{\circ}28'08''$; station *Initial* (see description thereof), 0.7 mile, $90^{\circ}05'04''$.

Line (Childress County, E. O. Heaton, 1923).—On the old State line, $5\frac{1}{2}$ miles due west of the town of Hollis, and 80 meters (262 feet) south of the highway from Hollis to Buck Creek, and 2 feet east of the old State line fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed about 2 feet east of a State line signboard, and 88.10 meters (289.0 feet) from the station, in azimuth $180^{\circ}43'$. Elevation of station, 517 meters (1,696 feet).

Dodson (Collingsworth County, E. O. Heaton, 1923).—On the old State line, three-fourths mile northeast of Dodsonville, at the northeast corner of the cemetery. Station is identical with the northeast corner of sec. 40 and southeast corner of sec. 41, lot 10 of the H. & G. N. railroad survey of the State of Texas.

¹ No check on this elevation.

For notes in regard to marking of stations see p. 154.

This corner was found marked by a stub and stone; the position of the stub was held and re-marked with standard disk station marks in concrete, notes 1 (a) and 7 (a). No reference mark was set. This point marks the northeast corner of the land of E. H. Dodson who lives one-fourth mile west of the station, and owns the north half of sec. 40. Azimuth to *Hollis city water tank*, is $319^{\circ}05'53''$. Elevation of station, 568 meters (1,864 feet).

Otex (Collingsworth County, E. O. Heaton, 1923).—About 9 miles west and $4\frac{1}{4}$ miles north of Vinson post office, $4\frac{1}{4}$ miles north of the Wellington-Vinson highway, 3 feet west of the old State line, and about three-fourths mile southeast of station *Coon* on a prominent knoll. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). The distance and azimuth of the *Texas-Oklahoma boundary, boundary mark (1921)* are 1,087 feet, $0^{\circ}23'10''$. Elevation of station, 625 meters (2,051 feet).

Texas-Oklahoma boundary, reference mark no. 2 (Wichita County, E. O. Heaton, 1923).—On a prominent knoll overlooking the river valley in the John Deck survey no. 275. It is about 3 miles east and one-half mile south of Burkburnett on the highest point of the knoll, about 100 feet south of edge of timber growing on steep slope of bluff. It may be conveniently reached from the Texas Company's pump station which is at the nearest point on the public road, and from which the highest part of the Texas bluff may be recognized to the northwest, a little over a mile distant. Monument designated "Holman Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of ground at station, 338 meters (1,109 feet).¹

Texas-Oklahoma boundary, sec. 14, witness point (Cotton County, Okla., E. O. Heaton, 1923).—Three and one-half miles east and 4 miles south of the town of Devol, a short distance west of the main road leading to the Burkburnett wagon bridge, on the Oklahoma bluff, on the north-and-south center line of sec. 14, T. 5 S., R. 13 W. Station marked by iron post with bronze cap as described in note 26A. Elevation of station, 327 meters (1,073 feet).

Texas-Oklahoma boundary, reference mark no. 4 (Wichita County, E. O. Heaton, 1923).—About 1 mile north and a short distance east of the town of Burkburnett, in the T. J. Redman survey no. 816. It is on the Texas bluff, 90 feet south of the top of a steep slope, at a point 630 feet east of the Fowler farmhouse. There is a large red barn and a galvanized-iron silo between the monument and the farmhouse. Point is designated "Fowler Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 315 meters (1,033 feet).¹

Texas-Oklahoma boundary, reference mark no. 7 (Wichita County, E. O. Heaton, 1923).—In the William Rivers survey, no. 810, about 2 miles west and 3 miles north of Burkburnett, near the Sinclair pump station, on a gentle north slope about 1,000 feet south of the top of the Texas bluff, and on the meridional extension of the line between ranges 13 and 14 west, in Oklahoma. Point is designated "South Range Line Station 14/13." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 318 meters (1,043 feet).¹

Texas-Oklahoma boundary, secs. 34/35, quarter corner (Tillman County, Okla., E. O. Heaton, 1923).—About $3\frac{1}{2}$ miles south and 2 miles east of the town of Grandfield, on nearly level ground just south of the top of a steep bluff, in the quarter section corner between secs. 34 and 35, T. 4 S., R. 14 W. Marked by iron post with bronze cap as described in note 26A.

Texas-Oklahoma boundary, reference mark no. 12 (Wichita County, E. O. Heaton, 1923).—On a prominent point of the Texas bluff, about one-half mile west of Bridgetown, near an electric power line which serves the oil field within the river bed. It is in the Hrs. of L. Powell survey no. 820, the northeast corner of which is coincident with witness post no. 141. Point is designated "Power Line Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 344 meters (1,129 feet).¹

Texas-Oklahoma boundary, north range line 15/14 (Tillman County, Okla., E. O. Heaton, 1923).—Five miles south and 2 miles west of the town of Grandfield, at top of Oklahoma bluff, on line through T. 5 S., between ranges 14 and 15 west, at point 30.0 feet south of corner of secs. 1, 6, 7, and 12. Marked by an

¹ No check on this elevation.

iron post with bronze cap as described in note 26A. Elevation of station, 320 meters (1,050 feet).¹

Texas-Oklahoma boundary, reference mark no. 15 (Wichita County, E. O. Heaton, 1923).—About 1,000 feet south of the south bluff of Red River, on land owned by Henry Scroeder, and on original survey no. 828. It is about 2 miles west and 1½ miles north of Clara. The house of Henry Scroeder bears S. 36° W., 440 feet distant. The nearest point on a public road bears S. 73°45' W., distant 1,200 feet. The point is designated "Scroeder Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 342 meters (1,122 feet).¹

Texas-Oklahoma boundary, sec. 10, witness corner (Tillman County, Okla., E. O. Heaton, 1923).—In the NW¼NW¼ of sec. 10, T. 5 S., R. 15 W., on a high sand hill overlooking the Red River valley. The corner of secs. 3, 4, 9, and 10 bears N. 29°20' W., distant 965.9 feet. This section corner is 4 miles west and 6 miles south of Grandfield. Station marked by an iron post with bronze cap as described in note 26A. Elevation of station, 349 meters (1,145 feet).¹

Texas-Oklahoma boundary, reference mark no. 16 (Wichita County, E. O. Heaton, 1923).—On the Foster and Allen farm, in original survey no. 833, close to the top of the south bluff of the Red River, and about 1,000 feet west of Tenth Cavalry Creek. It is 4 miles west and 2 miles north of Clara. The "Burke-Cameron" oil well no. 1 bears S. 11°30' W., distant 565 feet. The nearest point on a public road bears S. 86°15' W., 1,650 feet distant. The point is designated "Burke-Cameron" station. Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 326 meters (1,070 feet).¹

Texas-Oklahoma boundary, sec. 6, witness corner (Tillman County, Okla., E. O. Heaton, 1923).—On the site of old Fort Augur, in the NE¼ sec. 6, T. 5 S., R. 15 W., on the Indian allotment, south of Mr. Sharrock's house, on a high bluff overlooking the Red River. The corner of secs. 5, 6, 31, and 32, on north boundary of T. 5 S., R. 15 W., bears N. 71°34'30" E. from station, distant 1,068.9 feet. Station marked by iron post with bronze cap as described in note 26A. Elevation of station, 349 meters (1,145 feet).¹

Texas-Oklahoma boundary, reference mark no. 21 (Wichita County, E. O. Heaton, 1923).—On the J. D. Bonham farm, in block 278 of the Waggoner Colony subdivision, on a sand hill about 1,000 feet south of the south bluff of the Red River. It is 7½ miles north and 2 miles east of Electra. The north end of the Electra toll bridge across the Red River bears N. 40° W. A church steeple bears S. 48°30' W., distant about 3 miles. The nearest point on the public road bears S. 42° W., 1,900 feet. The station is designated "Cross Station", and is marked by a special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 346 meters (1,135 feet).¹

Texas-Oklahoma boundary, reference mark no. 18 (Wichita County, E. O. Heaton, 1923).—On W. E. Palmer's farm in the original James Cole survey no. 838, about 400 feet south of the river bluff, and 130 feet east of the west line of Palmer's land. It is 7 miles north and 5½ miles east of Electra. The nearest point on the public road is in front of Palmer's house, and bears S. 74°50' E., distant 2,080 feet. The station is on the meridional extension of the line between Rs. 15 and 16 W., in Oklahoma, and is designated "South Range Line 16/15." Marked with a special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 26B. Elevation of station, 330 meters (1,083 feet).¹

Texas-Oklahoma boundary, sec. 35, witness point (Tillman County, Okla., E. O. Heaton, 1923).—On a prominent sand hill in the NW¼SE¼ sec. 35, T. 4 S., R. 16 W., on an Indian allotment. The quarter section corner between secs. 26 and 35 bears N. 16°30'45" W., distant 2,897.7 feet. Said corner is 4 miles south and 8½ miles west of Grandfield. Station marked by iron post with bronze cap as described in note 26A. Elevation of station, 338 meters (1,109 feet).¹

Texas-Oklahoma boundary, sec. 29, witness point (Tillman County, Okla., E. O. Heaton, 1923).—Eleven miles west and 3½ miles south of Grandfield, in the NE¼SE¼ sec. 29, T. 4 S., R. 16 W., on a very high, prominent sand hill. The quarter section corner between secs. 28 and 29 bears N. 10°18'30" E., distant 617.9 feet. Harrison Clemer's house bears N. 27° E., distant about three-fourths mile. Station marked by iron post with bronze cap as described in note 26A. Elevation of station, 357 meters (1,171 feet).¹

¹ No check on this elevation.

Texas-Oklahoma boundary, north range line 17/16 (Tillman County, Okla., E. O. Heaton, 1923).—Thirteen miles west and 3 miles south of Grandfield, on high sand hill on north bluff of Red River, on line between Rs. 16 and 17 W., about 400 feet in northwesterly direction from the north end of the Electra toll bridge over the Red River. The quarter section corner between secs. 19 and 24, T. 4 S., Rs. 16 and 17 W., bears N. $0^{\circ}08'40''$ E., distant 2,185.9 feet. Marked by an iron post with bronze cap as described in note 26A. Elevation of station, 354 meters (1,161 feet).¹

Texas-Oklahoma boundary mark (1921) (Collingsworth County, E. O. Heaton, 1921; 1923).—About 8 miles west and 4 miles north of Vinson, Okla. A stone with cross common to the old State line and to the southwest corner of sec. 25, and the northwest corner of sec. 36, T. 6 N., R. 27 W., of the Oklahoma land survey. Elevation of station, 614 meters (2,014 feet).¹

Texas-Oklahoma old boundary, and T. 1 N., R. 27 W., secs. 2/11, corner (Childress County, E. O. Heaton, 1923).—Five and one-half miles west and 7 miles south of Hollis, and 206.87 meters (678.7 feet) in azimuth $179^{\circ}47'14''$ from station *Initial*. A gray stone with cross cut in top common to the old State line, and to secs. 2 and 11, T. 1 N., R. 27 W., of the Oklahoma land survey.

Texas-Oklahoma old boundary, and Tps. 2/3 N., R. 27 W., secs. 2/35, corner (Childress County, E. O. Heaton, 1923).—Five and one-half miles west of the town of Hollis, in center of road leading from Hollis to Buck Creek, and 80.04 meters (262.6 feet) in azimuth $180^{\circ}40'20''$ from station *Line*. Station is on old State line, and on line between secs. 2 and 35, Tps. 2 and 3 N., R. 27 W., of the Oklahoma land survey. Marked by a square block of limestone with cross cut in center.

ONE-HUNDREDTH MERIDIAN BOUNDARY ARC

Principal points

Fuller (Collingsworth County, W. Mussetter, 1927).—About $9\frac{1}{2}$ miles east and $4\frac{1}{2}$ miles south of Shamrock, on highest point of a ridge, a short distance south of oil pipe and telephone lines, and about 1 mile west of a lone tree. To reach from Shamrock go easterly along United States Highway No. 66 about 7 miles to Midway filling station, thence south 3 miles to a ranch house; pass through two gates into pasture and follow fence east 0.7 mile to pipe line; follow pipe-line road about 2.5 miles, turn south to top of ridge, and go east 0.1 mile to station. Surface and underground marks are standard disk station marks in concrete. Two reference marks were set, standard reference tablets in concrete. No. 1 is 20.18 meters (66.2 feet) from station in azimuth $143^{\circ}40'$; no. 2, 155.42 meters (509.9 feet) $224^{\circ}09'35''$. Elevation of station, 687.1 meters (2,254 feet).

Mayfield (Beckham County, Okla., W. Mussetter, 1927).—About $8\frac{1}{4}$ miles north and about $2\frac{1}{4}$ miles west of Erick, on highest point of hill at south side of road, on land belonging to A. B. Whipkey. Hill is covered with scrub oak, clumps of which are quite prominent. To reach from Erick go west one-half mile, then north for about 8.3 miles to road which turns west just south of Mayfield; follow this road west for about 2.2 miles to top of hill, when station will be about 400 feet to south. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 14.53 meters (47.7 feet) from station in azimuth $24^{\circ}05'$; no. 2, 152.23 meters (499.4 feet), $211^{\circ}10'09''$. Elevation of station, 665.6 meters (2,184 feet).

Wheeler (Wheeler County, W. Mussetter, 1927).—About 5 miles east and $2\frac{1}{2}$ miles south of Wheeler, about 12 miles north and 4 miles east of Shamrock, 10 miles west of the old State line, on a high point in a sandy pasture about one-half mile north of the road leading from the Shamrock-Wheeler highway to Kelton, about 0.3 mile west of a half section corner, and 100 meters (328 feet) north of an east-and-west wire fence. To reach from the Shamrock-Wheeler highway, follow Kelton road 3 miles to gate on north side of road, pass through gate and follow fence one-half mile north to quarter corner, thence 0.3 mile west to station. Surface and underground marks are standard disk station marks set in concrete. Reference marks are standard reference disks set in concrete, in fence line. No. 1 is 121.20 meters (397.6 feet) from station in azimuth $336^{\circ}48'17''$; no. 2, 113.80 meters (373.4 feet), $10^{\circ}38'45''$. Elevation of station, 775.4 meters (2,544 feet).

Rankin (Roger Mills County, Okla., W. Mussetter, 1927).—About 5 miles south and 1 mile west of Rankin, Okla., in NW $\frac{1}{4}$ sec. 3, T. 12 N., R. 26 W., in pasture land, 360 paces southeast of section corner, on a small knoll with green bushes on it, the highest point in the vicinity. About one-eighth mile southwest

¹ No check on this elevation.

For notes in regard to marking of stations see p. 154.

of this knoll is a house hidden in a grove, and 300 feet south of knoll is a cluster of bushes. To reach from Rankin go south 1 mile, east 1 mile, then south 3.7 miles to forks of road; take right-hand fork and go about 1.3 miles to gate at right with row of cottonwood trees running west and quite a growth of trees to north of them. Go through gate and follow road 1 mile to forks; take right fork and follow main traveled road in northwesterly direction for about 1.2 miles, when station will be about 300 feet north of road. Station marks are standard disk station marks in concrete. Elevation of station, 783.1 meters (2,569 feet).

Sockwell (Wheeler County, W. Mussetter, 1927).—About 5 miles south and 5 miles west of Rankin, Okla., about one-half mile west of State line (old), on highest point in sandy pasture, 150 meters (492 feet) south of fence. To reach from Rankin or Sweetwater take road to Meridian Lake; from north end of lake follow east side of fence 1.3 miles to gate, through gate, and 0.6 mile north to old windmill. Station is on top of sand dune three-fourths mile distant. Surface and underground marks are standard disk station marks set in concrete. Reference mark is standard reference tablet set in concrete, 2,347.9 meters (7,703 feet) from station in azimuth $311^{\circ}42'56''$. It is the same concrete block that was used as a reference mark for station *Lake* (see description thereof). Elevation of station, 782.9 meters (2,569 feet).

Zyback (Wheeler County, W. Mussetter, 1927).—About 6 miles east and 1 mile south of Zyback, about 4 miles west of the old State line, on a prominent hill with sand dunes on its east side, and about 1 mile south of the highway between Rankin and Zyback. Reached from Zyback by going east on highway to Rankin, about 6 miles, to farm belonging to Charles Levitt on north side of road, there turning south through gate and continuing south 1 mile to hill with station. Station marked by standard disk station mark in concrete. Not known if underground mark was set. Reference marks are standard reference disks in concrete; no. 1 is 121.32 meters (398.0 feet) from station in azimuth $305^{\circ}45'56''$; no. 2, 72.04 meters (236.4 feet), $10^{\circ}09'$. Elevation of station, 815.6 meters (2,676 feet).

Provinces (Roger Mills County, Okla., W. Mussetter, 1927).—About 4 miles north, and $1\frac{1}{2}$ miles west of Rankin, Okla., in sec. 22, T. 14 N., R. 26 W., on land owned by R. C. Provinces, about 100 feet west of an orchard owned by J. W. Provinces, about 130 feet south of road, and about 30 feet southwest of old shack. Reached from Rankin by going north 4 miles on road to Durham, then west on section line road about $1\frac{1}{2}$ miles to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 59.35 meters (194.7 feet) from station in azimuth $214^{\circ}36'$ and no. 2, 94.25 meters (309.2 feet) in azimuth $50^{\circ}04'$. Elevation of station, 759.8 meters (2,493 feet).

Hanna (Roger Mills County, Okla., W. Mussetter, 1927).—About 4 miles west and $2\frac{1}{2}$ miles north of Rankin, about 2,075 feet east of old State line, in NE $\frac{1}{4}$ sec. 30, T. 14 N., R. 27 W., on land belonging to J. B. Hanna, at south edge of a cultivated field, 335 feet west of west fence line of road, 30.0 feet north of an east-and-west fence line, and 18.3 feet southwest of the main trunk of the largest bush in a clump. Station reached from Rankin by going west on Zyback road for 4 miles and then turning north on a section line road and continuing $2\frac{1}{2}$ miles to point about 700 feet north of house at right of road where a row of cottonwood trees runs east of east side of road, and a fence runs west on west side. Station is just north of this fence. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 121.02 meters (397.0 feet) from station in azimuth $238^{\circ}22'45''$; no. 2, 9.48 meters (31.1 feet), $203^{\circ}53'$. Elevation of station, 775.6 meters (2,545 feet).

Hext (Hemphill County, W. Mussetter, 1927).—About 5 miles east and 4 miles north of Zyback, on land belonging to W. R. Hext, and occupied by Tom Hext, on highest point of hill or swell, about one-fourth mile east of Tom Hext's house, a short distance east of fence, and 200 meters (656 feet) north of fence corner. Reached from Zyback by following Rankin Road east about 4 miles, 1 mile east of schoolhouse, to gate on north side of road, then following pasture road northerly about 4 miles to Tom Hext's house. Surface and underground marks are standard disk station marks in concrete. Two reference marks were set, standard reference disks in concrete. No. 1 is 66.92 meters (219.6 feet) from station in azimuth $22^{\circ}42'$; no. 2, 45.25 meters (148.5 feet), $148^{\circ}01'$. Elevation of station, 773.0 meters (2,536 feet).

Gem (Hemphill County, W. Mussetter, 1927).—About $1\frac{1}{2}$ miles east and one-half mile north of the village of Gem, on the highest point of a prominent hill which breaks off sharply to the west and north, and has a gradual slope on

the east and south. To reach from Gem take route no. 24 east 1.6 miles to turn, thence north one-half mile to gate at corner, and west 400 meters (1,312 feet) to station. Station and underground marks are standard disk station marks set in concrete. Two reference marks were set. No. 1 is standard tablet set in concrete 23.10 meters (75.8 feet) from station, in azimuth $182^{\circ}03'$; no. 2 standard tablet set in rock outcrop, 39.59 meters (129.9 feet), $273^{\circ}19'$. Elevation of station, 791.8 meters (2,598 feet).

Antelope (Roger Mills County, Okla., W. Mussetter, 1927).—About $2\frac{1}{2}$ miles east and $4\frac{1}{4}$ miles north of Durham, in sec. 32, T. 17 N., R. 25 W., on highest point of Antelope Hills. To reach from Durham go east 2 miles on Highway 24, thence north on section line road $2\frac{1}{2}$ miles, through gate and by main pasture road 0.7 mile to forks. Follow right-hand fork one-half mile, then straight north through gate about one-half mile to foot of mesa. Station is about 250 meters (820 feet) northwest of road. Station marks are standard disk station marks set in rock. Reference marks are standard reference disks in rock. No. 1 is 167.36 meters (549.1 feet) from station, in azimuth $184^{\circ}27'02''$. No. 2, 54.55 meters (178.97 feet), $262^{\circ}34'$. Elevation of station, 792.4 meters (2,600 feet).

Daly (Ellis County, Okla., W. Mussetter, 1927).—About $6\frac{1}{4}$ miles south and $2\frac{1}{4}$ miles east of Higgins, Tex., about $1\frac{1}{4}$ miles east of old State line, on a prominent high point in a pasture which slopes up gradually from the west and drops off abruptly on the east side. Pasture is owned by Felix Daly and is about one-fourth mile northeast of house occupied by Homer Stucker. Station is about 100 meters (328 feet) north of fence line and 200 meters (656 feet) east of section line road. To reach from Higgins post office go south 0.6 mile, jog west, and follow main road south and east 6 miles to old State line; go south on old State line road 1 mile, thence east 1 mile, and south three-fourths mile, when station will be 200 meters (656 feet) to east. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 83.51 meters (274.0 feet) from station, in azimuth $295^{\circ}22'$; no. 2, 98.50 meters (323.2 feet), $30^{\circ}17'$. Elevation of station, 776.0 meters (2,546 feet).

Starbuck (Lipscomb County, W. Mussetter, 1927).—About 4 miles west and $3\frac{1}{2}$ miles south of Higgins, and about $1\frac{1}{4}$ miles due south of the buildings on the Starbuck ranch, on highest point of a ridge which is 700 feet east of a fence line and just west of a large area where sand holes have been blown in the ground. To reach from Higgins go west along Highway No. 33 (Southwest trail) 4.9 miles to a gate at south side of road with Starbuck sign at its top; turn south across railroad to ranch buildings owned by Starbuck and rented by Ivan Hale; turn east through barnyard and follow main pasture road 1 mile in southeasterly direction to fence corner with gate; go through gate and turn west along fence line and follow main road 0.6 mile, leave road and go south 0.6 mile to station site. Station marked by standard disk station mark in concrete. Not known if there is an underground mark. Reference marks are standard reference disks in concrete. No. 1 is 25.16 meters (82.5 feet) from station, in azimuth $308^{\circ}15'$; no. 2, 51.50 meters (169.0 feet), $10^{\circ}34'$. Elevation of station, 831.4 meters (2,728 feet).

Santa (Ellis County, Okla., W. Mussetter, 1927).—About $2\frac{1}{2}$ miles east and three-fourths mile north of Higgins, 1.3 miles east of old State line, on Atchison, Topeka & Santa Fe Railway right-of-way, at south side of tracks on highest point where dirt has been thrown back from cut, about one-third mile north of Highway No. 13, and about 250 feet west of a fence line. Station reached from Higgins by Texas Highway No. 33 to old State line, thence east on Oklahoma Highway No. 13 for 1.3 miles to point opposite station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 32.61 meters (107.0 feet) from station, in azimuth $239^{\circ}02'$; no. 2, 91.71 meters (300.9 feet), $42^{\circ}55'$. Elevation of station, 787.7 meters (2,584 feet).

Corn (Lipscomb County, W. Mussetter, 1927).—About $1\frac{1}{4}$ miles north and $1\frac{1}{4}$ miles west of Higgins, on highest point in a cultivated field, and about 300 meters (984 feet) north of a section line road. To reach from Higgins post office follow road north 0.6 mile, thence west 0.6 mile, turn north 1 mile to gate on section line left, and go west 0.8 mile, when the station will be on high ground 300 meters (984 feet) to north. Surface and underground marks are standard disk station marks set in concrete. Two reference marks were set, standard reference disks in concrete. No. 1 is 303.54 meters (995.9 feet) from station, in azimuth $5^{\circ}15'54''$; no. 2, 221.29 meters (726.0 feet), $89^{\circ}44'18''$. Elevation of station, 791.5 meters (2,597 feet).

For notes in regard to marking of stations see p. 154.

Moreland (Lipscomb County, W. Mussetter, 1927).—About $5\frac{1}{4}$ miles north and $5\frac{1}{4}$ miles west of Higgins, on highest point of grassy knoll about 200 feet long on top, in pasture land, about 300 paces south of section line fence, and about 200 feet west of a wire fence and cultivated field. There is a slightly lower hill about 700 feet south which has some rocks on its north side, land belongs to A. E. Moreland who lives about three-fourths mile northeast of the station. To reach from Higgins go north 0.6 mile, west 0.6 mile, north 2 miles, and west 4 miles to section line fence and gate at right. Turn north through gate and follow main pasture road north 2.3 miles to a dim road leading to left; take dim road and follow it to a gate at a fence corner, go through gate into cultivated field and turn north along fence line 0.4 mile. Station will then be at left about one-eighth mile distant, just west of cultivated field and fence line. Surface and underground marks are standard disk station marks set in concrete. Two reference marks were set, standard reference disks set in rock. No. 1 is 42.15 meters (138.3 feet) from station, in azimuth $56^{\circ}05'$; no. 2, 10.65 meters (34.9 feet), $123^{\circ}02'$. Elevation of station, 774.8 meters (2,542 feet).

Apple (Ellis County, Okla., W. Mussetter, 1927).—About 4 miles west and 2 miles south of Shattuck, 3 miles east of the old State line, on a prominent knoll at north side of a section line road and in north fence line of roadway, about 100 paces east of section corner, on land belonging to L. L. Apple, about one-third mile southwest of his house, and just south of a large pile of rocks. To reach from Shattuck go south 0.8 mile on Oklahoma Highway No. 15, west $2\frac{1}{2}$ miles, south 1 mile, and west $1\frac{1}{2}$ miles to section corner and station site. Station marked by standard disk station mark set in rock below surface of ground. Reference marks are standard reference disks set in concrete. No. 1 is 67.69 meters (222.1 feet) from station; no. 2, 40.19 meters (131.9 feet), azimuths unknown. *Shattuck water tank* is 4.3 miles from station in azimuth $251^{\circ}42'54''$. Elevation of station, 743.8 meters (2,440 feet).

Follett (Lipscomb County, W. Mussetter, 1927; 1931).—About one-half mile east of the town of Follett, in cultivated field belonging to O. A. Crump, about one-fourth mile southeast of house occupied by M. C. Sharp, about 100 meters (328 feet) east of section line road, and 400 meters (1,312 feet) north of the Atchison, Topeka & Santa Fe Railway tracks. Reached from Follett by following road east from railroad station 0.6 mile to Sharp's house, thence southeast to station. Surface and underground marks are standard disk station marks set in concrete. Two reference marks, standard reference disks in concrete, were set in the fence line on east side of road. No. 1 is 117.53 meters (385.6 feet) from station in azimuth $87^{\circ}06'46''$; no. 2, 181.48 meters (595.4 feet), $139^{\circ}36'42''$. Other azimuths from the station are: *Follett municipal water tank (black)*, *final*, $93^{\circ}27'54''$; Follett church, cupola, tip of cross, $115^{\circ}46'00''$. Elevation of station, 802.9 meters (2,634 feet).

Catesby south base (Ellis County, Okla., W. Mussetter, 1927).—About 5 miles south and 1 mile east of Catesby, about 10 miles north and $3\frac{3}{4}$ miles west of Shattuck, $3\frac{1}{2}$ miles east of old State line, on land belonging to the State of Oklahoma and leased by W. C. Quindt, on a high point, in a cultivated field, 318 feet north of north fence line along the Uncle Sam Highway, 101 feet southwest of southwest corner of grainhouse, and 126 feet northeast of the trunk of the northernmost of three trees. H. H. Howard lives a short distance southwest of the station, and on opposite side of road. To reach from Shattuck post office go north along main road to Follett (Uncle Sam Highway, marked with red, white, and blue) 11 miles to sign in northwest corner of roads, "Follett 13 mi.", thence west about 1.8 miles to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 294.47 meters (966.1 feet) from station in azimuth $293^{\circ}55'26''$; no. 2, 118.48 meters (388.7 feet), $356^{\circ}08'23''$. Elevation of station, 770.7 meters (2,529 feet).

Larkey (Lipscomb County, W. Mussetter, 1927; 1931).—About 4 miles north and $6\frac{1}{4}$ miles east of Follett, about three-fourths mile southwest of the northeast corner of Texas, on land belonging to O. L. McClure and occupied in 1927 by W. H. Larkey, on highest point in a field about one-half mile southwest of Larkey's house. To reach station from Follett, go north on Main Street to end of paving, then east 0.5 mile, north 3.0 miles, east 1.0 mile, north 1.4 miles, east 0.5 mile then north 1.0 mile to Trunk Line Highway. Follow Trunk Line Highway east 5.7 miles to turn to south, then south 0.5 mile to a turn to east, where a dim road leads south. Follow dim road south 0.5 mile to turn to west, and go west to a road leading south in front of Larkey's house. A large stone planted at

corner of fence will be found here. Continue west from stone about 100 yards to gate in fence on south side of road, going through gate follow road to house, thence through cultivated fields to station on top of rise to southwest. Surface and underground marks are standard disk station marks in concrete. Underground mark is 3 feet underground. Two reference marks were set, standard reference disks in concrete. No. 1 is 192.86 meters (632.7 feet) from station in azimuth $354^{\circ}34'33''$; no. 2, 226.48 meters (743.0 feet), in azimuth $86^{\circ}31'51''$. Elevation of station, 775.1 meters (2,543 feet).

Flat Top (Beaver County, Okla., W. Mussetter, 1927).—About $1\frac{1}{2}$ miles south and $1\frac{1}{4}$ miles west of Speermore, Okla., and about $10\frac{1}{2}$ miles north and 6 miles east of Follett, Tex., on a hill known locally as "Flat Top." Station is on south-east end of hill, about 0.4 mile south of section line road, and on land belonging to Clara Covey, who lives about 0.4 mile northeast of station. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 185.00 meters (607.0 feet) from station, in azimuth $187^{\circ}04'31''$; no. 2, 100.00 meters (328.1 feet), $79^{\circ}40'38''$. Azimuth from station of black tank at Follett, final, is $1^{\circ}43'36''$. Elevation of station, 788.3 meters (2,586 feet).

Catesby north base (Ellis County, Okla., W. Mussetter, 1927).—About $3\frac{1}{2}$ miles east of Catesby, 15 miles north and $1\frac{1}{4}$ miles west of Shattuck, $5\frac{3}{4}$ miles east of Old State line, at north side of trunk highway, about one-half mile east of a new house, 24 feet north of north fence line along highway, 344 feet northwest of northwest corner of old vacant house with windmill, and 240 feet east of lone bush at roadside. To reach from Shattuck go north 11 miles on main road to Follett (Uncle Sam Highway) to point where sign in northwest corner of roads reads "13 mi. to Follett"; then straight north 5 miles to sign "Shattuck 16 mi.", and east 0.7 mile to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 60.39 meters (198.1 feet) from station in azimuth $275^{\circ}47'$; no. 2, 135.20 meters (443.6 feet), $86^{\circ}16'58''$. Elevation of station, 766.4 meters (2,514 feet).

Martin (Beckham County, Okla., W. Mussetter, 1927).—About 10 miles south of Texola, about one-half mile east of old State line, on a prominent ridge running in northwesterly and southeasterly direction, on prominent knoll just east of pipe and telephone lines, and of road leading along pipe line through pasture. To reach from Shamrock follow United States Highway No. 66 easterly about 7 miles to Midway filling station, thence south 3 miles to ranch house; pass through two gates into pasture; follow fence east 0.7 mile to pipe line; then follow pipe line road about 10.4 miles to station on knoll about 200 feet east of road. From Texola, Midway filling station is reached by Highway No. 66 west 8 miles. Station marks are standard disk station marks in concrete, underground mark is 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 331.33 meters (1,087.0 feet) from station in azimuth $332^{\circ}44'18''$; no. 2 is 94.10 meters (308.7 feet), $96^{\circ}20'$. Elevation of station, 625 meters (2,051 feet).

Breaks (Beckham County, Okla., W. Mussetter, 1927).—About 3 miles south and one-fourth mile west of Texola, about 3,000 feet east of old State line, 575 feet west of west fence on old section line road, in pasture land, on a narrow ridge which runs westward from the fence about one-fourth mile, and then breaks off into creek bottoms. Station is not on highest point of ridge. To reach from Texola city water tank follow United States Highway No. 66 east, south, and east, 1.6 miles to road turning south over plank culvert; follow this road south 1.2 miles to house of T. A. Nay, thence into road into field north of house, and west one-fourth mile. Go south along west side of fence about 0.3 mile to forks; take right-hand fork 0.3 mile to house; about 100 feet west of house turn south through gate and follow fence in southwesterly direction about one-half mile to ridge, thence 0.6 mile southwest to station. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks in concrete. No. 1 is 176.93 meters (580.5 feet) from station in azimuth $259^{\circ}36'45''$; no. 2, 342.66 meters (1,124.2 feet), $94^{\circ}34'45''$. Azimuth to Texola water tank is $186^{\circ}50'53''$. Elevation of station, 648 meters (2,126 feet).

Texola (Beckham County, Okla., W. Mussetter, 1927).—About 1.3 miles north and one-half mile west of Texola, 1 mile north of the railroad, about 2,100 feet east of old State line, on a small sand hill, on cultivated land belonging to Mr. Cobb, about 0.3 mile north of a small lake, and 485 feet east of a road. To reach from Texola go west along United States Highway No. 66 about one-half mile,

then north 1 mile to point where there is an old gate. Station is about 485 feet to east of gate. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 142.09 meters (466.2 feet) from station, in azimuth $89^{\circ}57'38''$; no. 2, 516.02 meters (1,693.0 feet), $164^{\circ}46'37''$. Elevation of station 666 meters (2,185 feet).

Addis (Beckham County, Okla., W. Mussetter, 1927).—About 8 miles north and one-fourth mile west of Texola, and 2,200 feet east of the old State line, on highest point of a slight rise in sandy pasture land belonging to Mr. Addis, about one-fourth mile northwest of a house occupied by W. J. Bass, 700 feet northeast of vacant house at north end of row of cottonwood trees, 318 paces north of fence along south side of section line road, and 170 paces west of a north-and-south fence. Reached from Texola by following main street due north 6.5 miles, east one-half mile, north 1.5 miles to corner, west through gate at small house, and along sandy road west about 0.9 mile to house at end of cottonwoods, thence northeast 700 feet to station. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks set in concrete. No. 1 is 279.03 meters (915.5 feet) from station in azimuth $10^{\circ}55'01''$; no. 2, 18.82 meters (61.7 feet), $126^{\circ}18'$. Elevation of station, 625 meters (2,051 feet).

Dune (Beckham County, Okla., W. Mussetter, 1927).—About 5 miles west and $1\frac{1}{2}$ miles south of the town of Sweetwater, about 2,400 feet east of the old State line, on highest point of knoll in pasture land covered with scrub oaks, 845 feet east of east fence along section line and about 900 feet north of a row of cottonwood trees. There is another row of cottonwood trees about one-third mile to the north. Station reached from Sweetwater by going due west for 5 miles on section line road, then turning south through gate on section line and going south one-third mile to station. Station marks are standard disk station marks in concrete, the underground mark being 3 feet below the surface. Reference marks are standard reference disks in concrete. No. 1 is 16.59 meters (54.4 feet) from station in azimuth $145^{\circ}03'$; no. 2, 389.02 meters (1,276.3 feet), $2^{\circ}35'03''$. Elevation of station, 680 meters (2,231 feet).

Lake (Roger Mills County, Okla., W. Mussetter, 1927).—About $6\frac{1}{2}$ miles south and 4 miles west of Rankin, about one-fourth mile north and one-fourth mile west of Meridian Lake, about 1,900 feet east of State line in sec. 7, T. 12 N., R. 26 W., on a sand dune, at the south end and near center of a large bare sand spot which is about one-fourth mile long and about as wide, and about 585 feet west of a fence line which runs along west edge of lake. There are two small cottonwood trees on west side of dune, and one on east side. Reached from Rankin by going west on the Zyback road 4 miles, then turning south on section-line road and going 5 miles to fence corner, thence southwest about 0.3 mile to fence and gate which leads to station *Sockwell*. From this gate follow main road in southeasterly direction about 0.7 mile to fence corner, then go south 0.3 mile, and west to station. Station marks are standard disk station marks in concrete. Reference mark is standard reference disk in concrete 556.3 meters (1,825 feet) from station in azimuth $208^{\circ}17'31''$. Elevation of station, 744 meters (2,441 feet).

Locust (Roger Mills County, Okla., W. Mussetter, 1927).—About 6 miles north and 4 miles west of Rankin, about 1,800 feet east of old State line, in sec. 6, T. 14 N., R. 27 W., on a slight rise in a sandy field which has been cultivated. Station is 430 feet north of section-line fence, about 600 feet west of section-line road which has a long row of cottonwood trees along its east side, and 700 feet northwest of old shed at section corner. Reached from Rankin by Zyback road west 4 miles, thence north 6 miles to section corner and old shed. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 225.19 meters (738.8 feet) from station in azimuth $300^{\circ}58'14''$; no. 2, 133.53 meters (438.1 feet), $359^{\circ}28'22''$. Elevation of station, 736 meters (2,415 feet).

Washita (Roger Mills County, Okla., W. Mussetter, 1927).—About 4 miles west and $1\frac{1}{2}$ miles south of Durham, Okla., about 2,000 feet east of old State line, one-half mile north of Highway No. 24, on highest point of pasture land, about 100 meters (328 feet) west of section-line road, and 70 meters (230 feet) north of fence between pasture and cultivated field to south. To reach from Durham follow Highway No. 24 west and south to first section-line road east of old State line; follow this road north one-half mile and station will be at left. Station marks are standard disk station marks in concrete. Reference marks

For notes in regard to marking of stations see p. 154.

are standard reference disks in concrete. No. 1 is 123.59 meters (405.5 feet) from station in azimuth $299^{\circ}33'59''$; no. 2, 128.40 meters (421.3 feet), $63^{\circ}49'37''$. Elevation of station, 757 meters (2,484 feet).

Canadian (Ellis County, Okla., W. Mussetter, 1927).—About $12\frac{1}{4}$ miles south and $1\frac{1}{2}$ miles east of Higgins, Tex., about 1,945 feet east of the old State line, on a small knoll in pasture land, about one-fourth mile southwest of A. J. McKesson's house, with small red barn in grove, 335 paces southeast of a windmill, and 140 paces west of a plain pasture road which leads south from red barn. There is a slightly smaller knoll between this road and the station. To reach from Higgins post office go south 0.4 mile, jog west, and follow main road south and east until 6.6 miles from post office, and road turns south at old State line; turn south along old State line road and go 6 miles to where road turns east, towards McKesson's house. Station marks are standard disk station marks in concrete; underground mark is 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 14.095 meters (46.24 feet) from station in azimuth $158^{\circ}19'$; no. 2, 22.10 meters (72.5 feet), $267^{\circ}11'$. Elevation of station, 744 meters (2,441 feet).

Stucker (Ellis County, Okla., W. Mussetter, 1927).—About $5\frac{1}{2}$ miles south and $1\frac{1}{2}$ miles east of Higgins, about 2,200 feet east of old State line, on land belonging to S. S. Stucker, who lives just west of station at State line. To reach from Higgins go south from post office 0.4 mile, jog west, and south again along main road until 6.6 miles from post office. At this point old State line will be reached and road turns south along line. Stucker's house is just east of road at this corner. Go east from State line road through Stucker's barnyard and along north side of fence line 0.4 mile to fence corner on hill; station is 15 paces south of this point. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks in concrete. No. 1 is 49.17 meters (161.3 feet) from station, in azimuth $290^{\circ}33'$; no. 2, 707.12 meters (2,319.9 feet), $94^{\circ}51'06''$. Elevation of station, 776 meters (2,546 feet).

Mussetter (Ellis County, Okla., W. Mussetter, 1927).—About $1\frac{1}{2}$ miles east and one-third mile north of Higgins, about 1,900 feet east of old State line, about one-eighth mile south of the Atchison, Topeka & Santa Fe Railway, on fence line about 600 feet northeast of white house, and 500 feet north and 63 feet east of a red barn. Station reached from Higgins by going east to old State line on State Highway No. 33, thence south across Atchison, Topeka & Santa Fe Railway tracks about 0.1 mile, then east on road through cultivated field to white house and red barn referred to above. Station marked by standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 231.38 meters (759.1 feet) from station in azimuth $90^{\circ}06'33''$; no. 2, 594.28 meters (1,949.7 feet), $135^{\circ}09'52''$. Azimuth to Higgins water tank, is $67^{\circ}33'18''$. Elevation of station, 780 meters (2,559 feet).

Higgins astronomical station (1903) (Lipscomb County, W. Mussetter, 1927).—Longitude station established in 1903 by United States Government Land Office. Located in the town of Higgins, about one-fourth mile north of the Atchison, Topeka & Santa Fe Railway tracks, on land belonging to H. A. Walker. To reach from Peugh's gasoline station at Higgins, go north 1 block, east a short distance to first alley which leads north, thence 250 feet through alley. Station will be found about 100 feet east of the alley fence and nearly east of an old windmill which has been blackened by fire. Station marked by a concrete pier in the form of frustum of a pyramid, 18 by 24 inches, 36 inches in ground and 30 inches above ground. Lower base 24 by 30 inches. Elevation of station, 781 meters (2,562 feet).

Kelln (Ellis County, Okla., W. Mussetter, 1927).—About 7 miles west and $2\frac{1}{2}$ miles south of Shattuck, about 1,900 feet east of old State line, on a grassy knoll in a pasture and 75 paces south of wire fence. A pasture road runs over the top of the knoll to a vacant house about one-fourth mile to southeast owned by Dave Kellen. Windmill at this house is visible from station on bearing 130° . To reach station from Shattuck go south 0.8 mile on Oklahoma Highway No. 15, then west $2\frac{1}{2}$ miles, south 1 mile, west 4 miles to gate at south side of road, south through gate and follow pasture road 0.3 mile to fork, take left-hand fork and follow it southeast 0.3 mile to fence corner and station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1, distance not measured, is in azimuth $220^{\circ}05'$ from station, while distance and azimuth of no. 2 are 76.50 meters (251.0 feet), $111^{\circ}40'$. Elevation of station, 745 meters (2,444 feet).

Hartman (Ellis County, Okla., W. Mussetter, 1927).—About $6\frac{3}{4}$ miles west and $3\frac{1}{4}$ miles north of Shattuck, about 2,100 feet east of the old State line, on highest point of a hill with flat top and low rim of rock around south and west sides, on land owned by C. A. Hartman, and about one-half mile north of a house owned and occupied by A. W. Starbuck. Station reached from Shattuck by going north 2 miles from post office, turning west and following main road for 6.3 miles, then north for 1 mile, going through gate in section line fence and continuing north along pasture road for 0.4 mile, when station will be on top of hill to east. Station marked by triangular hole in ground. Reference marks are standard reference disks in rock. No. 1 is 587.58 meters (1,927.8 feet) from station, in azimuth $74^{\circ}10'46''$; no. 2, 122.90 meters (403.2 feet), $204^{\circ}42'44''$. Azimuth to *Shattuck water tank*, is $300^{\circ}44'13''$. Elevation of station, 742 meters (2,434 feet).

Ellis (Lipscomb County, W. Mussetter, 1927).—About $7\frac{1}{2}$ miles east and 2 miles north of Follett, about 1,800 feet east of old State line, and about $2\frac{1}{2}$ miles north of main road between Shattuck and Follett (Uncle Sam Highway), on highest point of a grassy hill, 100 paces west of fence line and 185 paces north of another fence. To reach from Follett go east to old State line on Uncle Sam Highway, continue about 0.2 mile east of line, then north along fence line $2\frac{1}{2}$ miles to point where fences run to north, south, and west, but none to east. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 167.90 meters (550.9 feet) from station in azimuth $4^{\circ}16'33''$; no. 2, 254.92 meters (836.4 feet), $140^{\circ}22'42''$. Elevation of station, 776 meters (2,546 feet).

Kidder monument (1903) eccentric (Lipscomb County, W. Mussetter, 1927).—An unmarked point, 355.074 meters (1,164.94 feet) in azimuth $79^{\circ}12'37''$ from station *Kidder monument (1903)* (see description thereof). Elevation of station, 759 meters (2,490 feet).

Supplementary points

Kidder monument (1903) (Ellis County, Okla., General Land Office, 1903 W. Mussetter, 1927; 1931).—About 1,754 feet east and 243 feet north of old stone at old northeast corner of Lipscomb County, Tex., and east end of Cimarron base in T. 23 N., R. 26 W., on land belonging to A. A. Larkey, whose home is one-half mile to south. Station is in cultivated field, and is marked by a concrete monument, the frustum of a cone about 18 inches in diameter projecting 30 inches above the ground, encased in zinc, and marked:

36	30 N.L.
100	W.L.
1903	

In 1927 a standard disk station mark was set in monument. Reached from Follett, Texas, by following description given for station *Northeast corner of Texas (1928)*.

Old northeast corner of Texas (Lipscomb County, W. Mussetter, 1927).—About three-fourths mile northeast of station *Larkey* (see description thereof), at old northeast corner of Lipscomb County, and about 1,800 feet south of west from *Kidder monument (1903)* (see description thereof). Station reached by following directions for station *Larkey* to home of W. H. Larkey. Marked by a sandstone post 12 by 15 by 48 inches, found broken off at surface of ground. It is marked:

36	30
NE. Cor. Texas	
I. T.	

Post replaced approximately in its original position, and center determined. This mark was placed by Chaney and Smith in 1881 to mark the east end of the Cimarron base. It must not be confused with the *Northeast corner of Texas (1928)* (described elsewhere), established in 1928 by order of the Supreme Court of the United States.

THIRTY-FIFTH PARALLEL ARC

Principal points

Self (Beckham County, Okla. E. O. Heaton, 1921; 1927).—Two and three-fourths miles east and $5\frac{1}{2}$ miles south of Erick, in the SW $\frac{1}{4}$ sec. 26, T. 8 N., R. 25 W., on land belonging to J. R. Self, about 200 meters (656 feet) south

of east from his house (on the same quarter section), about 300 meters (984 feet) east of the southwest corner of sec. 26, and 200 meters (656 feet) north of a road on the south side of that section. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 172.99 meters (567.6 feet) from station in azimuth $7^{\circ}37'56''$. In 1927 station recovered in good condition, land belonging to heirs of J. R. Self, and rented and occupied by Jack Teel. Elevation of station, 648.8 meters (2,129 feet.)

Vinson (Harmon County, Okla., E. O. Heaton, 1921; 1927).—One and one-half miles west and three-fourths mile north of the Vinson post office in the NE. $\frac{1}{4}$ sec. 18, T. 5 N., R. 25 W., on property belonging (in 1927) to Mr. Reynolds and rented by J. B. Shirley, on top of a high knoll on line between cotton patch and corn patch, about one-half mile northwest of Shirley's house. Reached from Vinson $1\frac{1}{2}$ miles west on Highway No. 9, thence north three-fourths mile to Shirley's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a) 26.69 meters (87.6 feet) from station in azimuth $267^{\circ}20'$. Elevation of station, 602.2 meters (1,976 feet).

Branson (Collingsworth County, E. O. Heaton, 1921; 1927).—Four miles north and one-half mile east of Wellington, on a sandy ridge, on land belonging to Mrs. Lucy B. Wells of Wellington, and in charge of Mr. Price Sullivan, and about one-half mile east of the Wellington-Shamrock wagon road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 38.13 meters (125.1 feet) from station in azimuth $182^{\circ}48'$; no. 2, 6.79 meters (22.3 feet) $107^{\circ}34'$. The station was recovered in 1923, and the marks found in poor condition, the underground mark $1\frac{3}{4}$ inches off center. New marks were put in of the same general types as above, but full size and good quality. A reference mark was also added in 1923 consisting of standard reference disk in concrete block, note 11 (a), 114.92 meters (377.0 feet) north of station, in east-and-west fence line. Station recovered in 1927 in good condition. It was reached at that time from Wellington by going west one-half mile to main road leading north to Shamrock, following this main road north about $4\frac{1}{2}$ miles to road leading east, thence east one-half mile to end of road at farm house. Station was on a high knoll in pasture a short distance east of this house. All marks were stamped with name of station and date. Elevation of station, 674.3 meters (2,212 feet).

Coon (Collingsworth County, E. O. Heaton, 1921; 1927).—About 9 miles west and $4\frac{1}{2}$ miles north of Vinson, Okla., and about 3 miles east of the Salt Fork of the Red River, in the Coon pasture, on a grassy knoll, about three-fourths mile northwest of the Texas-Oklahoma boundary post, which is common to secs. 25 and 36, T. 6 N., R. 27 W. In 1927 reached from Wellington by going east on road to Vinson, to State line, or from Vinson west on Highway No. 9 to State line, and thence along road leading north along State line for one-half mile, then west one-half mile, then turning north again and following main traveled road in a northerly direction for 3 miles to gate at north side of road. Go through gate and proceed one-half mile to another gate with iron posts. Station is on high point 1 mile north of this gate. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). The 1921 marks were replaced in 1923 with more substantial marks of same type. Reference mark is a standard reference disk in concrete, note 11 (a), 48.53 meters (159.2 feet) from station in azimuth $182^{\circ}49'$. Elevation of station, 630.1 meters (2,067 feet).

Trimmins (Collingsworth County, E. O. Heaton, 1921).—About 4 miles south and 2 miles west of Shamrock, a town on the Chicago, Rock Island & Gulf Railway, on the highest point of the southernmost of the two mesas, in pasture land belonging to the Will Iron Cattle Co. of Denver, Colo. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 18.73 meters (61.4 feet) from station, in azimuth $181^{\circ}48'$; no. 2, 14.01 meters (46.0 feet), $88^{\circ}11'$. Elevation of station, 757.1 meters (2,484 feet).

Bain (Donley County, E. O. Heaton, 1921).—About 2 miles east of Hedley, a town on the Fort Worth & Denver City Railway, on land belonging to D. M. Fitzgerald, about 30 meters (98 feet) southwest of his house, and 30 meters (98 feet) north of the Hedley-Mamphis wagon road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two

reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 28.59 meters (93.8 feet) from the station, in azimuth $267^{\circ}18'$; no. 2, 38.92 meters (127.7 feet), $1^{\circ}22'$. Elevation of station, 804.0 meters (2,638 feet).

Rowe (Gray County, E. O. Heaton, 1921).—About 3 miles east and one-fourth mile south of Alanreed, a town on the Chicago, Rock Island & Gulf Railway, and about 4 miles west and $1\frac{1}{4}$ miles south of McLean, in section 66, block E, on the highest knoll in the vicinity, on land belonging to J. H. Easterling, in a cultivated field in the northwest corner of his ranch and about 80 meters (262 feet) southeast of a turn in the public highway leading east from Alanreed, on south side of the C., R. I. & G. Ry. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 113.9 meters (374 feet) from station in azimuth $89^{\circ}50'14''$; no. 2, 130.21 meters (427.2 feet), $120^{\circ}07'$. Elevation of station, 936.5 meters (3,072 feet).

Jerico (Donley County, E. O. Heaton, 1921).—About one-half mile south and three-fourths mile west from Jerico depot on the Chicago, Rock Island & Gulf Railway. Station is on land belonging to Mrs. C. C. Shoop of Jerico, and is at the east edge of a pasture, about 35 meters (115 feet) west of the center line of a north-and-south road and just across the road from the southwest corner of the Jerico graveyard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 14.78 meters (48.5 feet) from station, in azimuth $272^{\circ}09'$; no. 2, 28.19 meters (92.5 feet), $210^{\circ}57'$. Elevation of station, 976.5 meters (3,204 feet).

Brumley (Donley County, E. O. Heaton, 1921).—About 2 miles west and $2\frac{1}{2}$ miles south of Clarendon, a town on the Fort Worth & Denver City Railway, on land belonging to O. C. Hill, about 30 meters (98 feet) east and 60 meters (197 feet) south of his house, and 10 meters (33 feet) south of the highway, which makes a turn at this point. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 3.82 meters (12.5 feet) from station, in azimuth $180^{\circ}03'$; no. 2, 15.83 meters (51.9 feet), $259^{\circ}48'$. Elevation of station, 896.0 meters (2,940 feet).

McDowell (Armstrong County, E. O. Heaton, 1921).—One and one-half miles west and 2 miles south of Goodnight, a town on the Fort Worth & Denver City Railway, on land belonging to W. W. McDowell, about 1 mile due south of his house, in a pasture, about 75 meters (246 feet) south of a fence corner, and 10 meters (33 feet) east of north-and-south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 69.84 meters (229.1 feet) from station, in azimuth $169^{\circ}45'$; no. 2, 26.24 meters (86.1 feet), $263^{\circ}36'$. Elevation of station, 1,001.5 meters (3,286 feet).

Lark (Carson County, E. O. Heaton, 1921).—About 160 meters (525 feet) east of the Chicago, Rock Island & Gulf Railway water tank at Lark, on the railroad right-of-way, about 30 meters (98 feet) north of the track, about 20 meters (66 feet) south of center line of the Postal Highway, and 7.575 meters (24.85 feet) north of B.M. N 19. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 10.535 meters (34.56 feet) from station in azimuth $172^{\circ}05'$; no. 2, 25.59 meters (83.96 feet), $271^{\circ}37'$. Azimuth to *Lark, water tank*, is $81^{\circ}20'10''$; and to bench mark, $352^{\circ}10'$. Elevation of station, 1,027.96 meters (3,372.6 feet).

Wilson (Armstrong County, E. O. Heaton, 1921).—About $3\frac{1}{2}$ miles south and 3 miles west of the courthouse at Claude, a town on the Fort Worth & Denver City Railway, on land belonging to W. E. Smotherland, who lives in Claude, about 0.4 mile west of Smotherland's tenant house and windmill, in a pasture, 75 meters (246 feet) north of the east-and-west fence and 23 meters (75 feet) east of north-and-south fence, $1\frac{1}{2}$ miles west of the Claude-Hughlett Highway. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 22.37 meters (73.4 feet) from station in azimuth $87^{\circ}12'$; no. 2, 75.88 meters (248.9 feet), $12^{\circ}49'$. Elevation of station, 1,047.4 meters (3,436 feet).

Conway (Carson County, E. O. Heaton, 1921).—About 0.4 mile west of the railway station at Conway, on the Chicago, Rock Island & Gulf right-of-way, about 35 meters (115 feet) south of the main track, 15 meters (49 feet) east of a

railway switch, 15 meters (49 feet) north of the south right-of-way fence, and 50 meters (164 feet) east of the north-and-south fence at point where road makes a short jog. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 20.75 meters (68.1 feet) from station in azimuth $2^{\circ}54'$; no. 2, 55.63 meters (182.5 feet), $115^{\circ}25'$. Elevation of station, 1,055.0 meters (3,461 feet).

Washburn (Armstrong County, E. O. Heaton, 1921).—About one-half mile northeast of the Washburn railway station on the Fort Worth & Denver City Railway, on the north side of Washburn townsite, 22 meters (72 feet) south of an east-and-west fence line, and 102 meters (335 feet) west of a north-and-south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 100.04 meters (328.2 feet) from station in azimuth $266^{\circ}37'$; no. 2, 19.89 meters (65.3 feet), $188^{\circ}51'$. Elevation of station, 1,078.1 meters (3,537 feet).

Butterfield (Armstrong County, E. O. Heaton, 1921; 1932).—About 9 miles south and 2 miles west of Washburn, a town on the Fort Worth & Denver City Railway. Station is 1 mile west of house occupied by Mr. Berry, county commissioner. Mr. Berry's house is about one-fourth mile north of the site of the N. F. Butterfield house, which has been removed since the station was established. Station is about 6 meters (20 feet) south of an old east-and-west fence line. A section line road has been built south of this line so that station is now under the north shoulder of the road, in good condition, covered by about 3 inches of loose dirt. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is under the hard traveled portion of the north-and-south road, and is 36.03 meters (118.2 feet) from station in azimuth $99^{\circ}20'$. In 1932 it was not uncovered, but the county commissioner reported that it had been protected in building the road, and was in position and in good condition. No. 2 is in the fence line north of the road, 31 paces from fence corner in northeast road corner, and 6.20 meters (20.3 feet) from station in azimuth $177^{\circ}32'$. To reach the station from Washburn go west on United States route 370 for a distance of 2.0 miles from the railroad station to a large Amarillo Chamber of Commerce sign; turn left (south) and go due south 9.5 miles to crossroads and station site. In 1932 station was occupied eccentrically. *Butterfield eccentric* is just north of the fence line, 8.905 meters (29.22 feet) north of the station; 2.725 meters (8.94 feet) from reference mark no. 2; 11.30 meters (37.1 feet) from center line of the east-and-west road; and 34 meters (112 feet) from center line of north-and-south road. Elevation of station, 1,066.6 meters (3,499 feet).

Benton (Potter County, E. O. Heaton 1921; 1932).—About $2\frac{1}{2}$ miles east and three-fourths mile south from the post office at Amarillo, on the crest of a rise east of a dry lake bed, 70 meters (230 feet) south of the Amarillo-Washburn wagon road, 15.45 meters (50.7 feet) east of the north-and-south fence line, and about one-fourth mile west of W. B. Benton's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 15.45 meters (50.7 feet) from station in azimuth $94^{\circ}30'$; no. 2 is 62.5 meters (205 feet) $165^{\circ}27'$. In 1932 station recovered as described. Land where station stands now belongs to Phil Denitz of Los Angeles. It is in a subdivision, but slightly built up. Station now 80 yards south of center line of United States route 370; about 135 yards southeast of the Tri-State camp grounds and filling station, and about 300 yards southeast of broadcasting station KGRS. Elevation of station, 1,111.4 meters (3,646 feet).

Merry (Randall County, E. O. Heaton, 1921; 1932).—About 11 miles south of the post office in Amarillo, on land belonging to S. P. Merry, in a pasture about 1 mile west and $1\frac{1}{4}$ miles south of the Merry ranch house, three-fourths mile south of an iron gate in a fence on the east side of the highway, and $17\frac{1}{2}$ meters (57 feet) east of this fence; station is also one-half mile north of the southwest corner of Merry's ranch, and three-fourths mile north of Paloduro Canyon at a point where the public highway crosses the canyon. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 17.32 meters (56.8 feet) from station in azimuth $88^{\circ}42'$; no. 2, 39.03 meters (128.1 feet), $26^{\circ}32'$. The following azimuths were determined in 1932: *Airway beacon no. 28*, first beacon southwest of Amarillo, $131^{\circ}36'36''$; *Amarillo Country*

Club, water tank, finial, 2.5 miles west of Amarillo, $166^{\circ}40'22''$; *Amarillo, Santa Fe Building, chimney*, $182^{\circ}48'28''$; *English Field, airways beacon*, 5 miles east of Amarillo, $211^{\circ}44'02''$; *Amarillo, Price Memorial College, tank*, $194^{\circ}51'20''$. Elevation of station, 1,104.1 meters (3,622 feet).

Bushland (Randall County, E. O. Heaton, 1921).—One mile south and one-fourth mile east of Bushland railway station, on sec. 164, block 9, about one-fourth mile east of the corner of this section. It is on land belonging to W. H. Bush, and in charge of his brother, J. A. Bush of Amarillo, one-half mile west of house occupied by J. M. Fogg, and 50 meters (164 feet) south of public highway. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 22.29 meters (73.1 feet) from station, in magnetic azimuth 345° ; no. 2, 49.79 meters (163.4 feet), in true azimuth $248^{\circ}30'$. Elevation of station, 1,166.5 meters (3,827 feet).

Umbarger (Randall County, E. O. Heaton, 1921).—Four miles north and one-half mile west of Umbarger, a small town on the Atchison, Topeka & Santa Fe Railway, one-half mile north of a house belonging to Mr. Fremmel, one-half mile west of a public highway leading north from Umbarger, and about 1 mile south of Paloduro Canyon. Station is on land belonging to Judge Word of Amarillo, and is about 30 meters (98 feet) north of a section line fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete note 11 (a). No. 1 is 48.83 meters (160.2 feet) from station in true azimuth $288^{\circ}.6$; no. 2, 16.17 meters (53.1 feet), in magnetic azimuth 166° . Elevation of station, 1,151.0 meters (3,776 feet).

Evert (Oldham County, E. O. Heaton, 1921).—About 7 miles east of Vega, one-half mile east of Evert Switch on the Chicago, Rock Island & Gulf Railway, near west end of light cut, and on north side of the Garrison Ranch pasture. Station is about 50 meters (164 feet) south of the Ozark Trail and one-half mile east of jog in same, 75 meters (246 feet) south of railway tracks, and three-fourths mile west of C. L. Garrison's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 44.43 meters (145.8 feet) from station in magnetic azimuth $44^{\circ}45'$. The distance and magnetic azimuth of no. 2 are 44.25 meters (145.2 feet), 313° . Elevation of station 1,219.8 meters (4,002 feet).

Whitsett (Deaf Smith County, E. O. Heaton, 1921).—About 11 miles south and 2 miles west of Evert Switch, on the Chicago, Rock Island & Gulf Railway, 14 miles southwest of Wildorado, 17 miles north of Hereford, on land belonging to E. J. Brann, who lives $1\frac{1}{2}$ miles southwest of the station. Magnetic bearing of Brann's house is 235° . Station is 2 miles southwest of the Baker ranch house, 1 mile south of the Ford ranch house, one-fourth mile southwest of a lone windmill, and $1\frac{1}{2}$ miles east of a fenced highway known as "The Avenue." Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 28.31 meters (92.9 feet) from station in magnetic azimuth $40^{\circ}30'$; no. 2, 27.80 meters (91.2 feet), magnetic azimuth $310^{\circ}30'$. From the station the azimuth of Hereford city water tank is $3^{\circ}16'16''$, and of E. J. Brann's house, east chimney, distant $1\frac{1}{2}$ miles, $69^{\circ}27'34''$. Elevation of station, 1,206.4 meters (3,958 feet).

Vega north base (Oldham County, E. O. Heaton, 1921).—About 7 miles southeast of Adrian, and 10 miles by road southwest of Vega, in the southwest quarter of sec. 77, block K 6, on land belonging to H. Morell, about 1 mile south of his house, about 20 meters (66 feet) north of an east-and-west fence line and 46 meters (151 feet) east of a north-and-south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 18.97 meters (62.2 feet) from station in azimuth $7^{\circ}.4$; no. 2, 47.34 meters (155.3 feet), $67^{\circ}27'$. Elevation of station 1,260.1 meters (4,134 feet).

Vega south base (Deaf Smith County, E. O. Heaton, 1921).—About 15 miles southwest of Vega, on ranch belonging to J. H. Mccaskey, in a pasture about $1\frac{1}{2}$ miles north of his ranch house and stock pens, the azimuth of the west chimney of house being $2^{\circ}54'$. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 46.75 meters (153.4 feet) from station in azimuth $134^{\circ}33'$; no. 2, 58.31 meters (191.3 feet), $46^{\circ}01'$. Elevation of station, 1,274.0 meters (4,180 feet).

Harwell (Deaf Smith County, E. O. Heaton, 1921).—About 12 miles southwest of Adrian, a town on the Chicago, Rock Island & Gulf Railway, on pasture land owned by Landergin Brothers of Amarillo, about one-fourth mile west of fence line of land belonging to J. A. Cheatem and $1\frac{1}{4}$ miles southwest of his ranch house, about one-fourth mile east of the west edge of the cap rock, and on highest point of ground in the vicinity. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 18.18 meters (59.6 feet) from the station in azimuth $127^{\circ}00'$; no. 2, 38.25 meters (125.5 feet), $216^{\circ}07'$. The azimuth to *Glenrio water tank* is $89^{\circ}30'51''$. Elevation of station, 1,333.1 meters (4,374 feet).

Bippus (Deaf Smith County, E. O. Heaton, 1921).—About 13 miles south of Glenrio, New Mexico, about 35 miles northwest of Hereford, about $1\frac{1}{4}$ miles east of the Texas-New Mexico boundary, 5 miles east of north from Clark monument no. 9, 6 miles W. 23° S. from the house of George Bippus, on the highest point of land in the vicinity, about 200 meters (656 feet) east from the west edge of the cap rock, and about 1 mile north of a wagon road leading down into the valley. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 38.56 meters (126.5 feet) from station in azimuth $321^{\circ}08'$; no. 2, 45.98 meters (150.9 feet), $17^{\circ}05'$. Elevation of station, 1,366.3 meters (4,483 feet).

Warmuth (Quay County, N.Mex., E. O. Heaton, 1921).—About 11 miles north and 3 miles east of San Jon, a town on the Chicago, Rock Island & Gulf Railway, on the highest point of a high ridge, 1 mile to the south of where it breaks off abruptly at rim rock, in the NW $\frac{1}{4}$ sec. 20, T. 12 N., R. 35 E., on land belonging to B. F. Peck, about 150 meters (492 feet) southeast of A. Warmuth's house, and 60 meters (197 feet) south of the east-and-west fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a) at the following distances and azimuths from the station: No. 1, 18.90 meters (62.0 feet), $17^{\circ}48'$; no. 2, 19.88 meters (65.2 feet), $279^{\circ}50'$. Elevation of station, 1,276.0 meters (4,186 feet).

Martin (Quay County, N.Mex., E. O. Heaton, 1921).—About 9 miles south and 4 miles west of San Jon, a town on the Chicago, Rock Island & Gulf Railway, and about $1\frac{1}{2}$ miles northwest of where the road which leads up onto the rim rock from San Jon turns to the southward. C. L. Height lives at the turn of the road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a), at the following distances and azimuths from station: No. 1, 19.96 meters (65.5 feet), $170^{\circ}59'$; no. 2, 18.75 meters (61.5 feet), $81^{\circ}03'$. Elevation of station, 1,511.0 meters (4,957 feet).

Canadian (Quay County, N.Mex., E. O. Heaton, 1921).—About 11 miles north and 3 miles east of San Jon, in SW $\frac{1}{4}$ sec. 17, T. 12 N., R. 35 E., at edge of high bluff on south side of Rana Creek Valley, on land belonging to Mrs. Ellison, about 1 mile due north of A. Warmuth's house, and only a few meters south of a rim rock. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a), at the following distances and azimuths from the station: No. 1, 24.02 meters (78.8 feet), $17^{\circ}22'$; no. 2, 18.11 meters (59.4 feet), $101^{\circ}12'$. Elevation of station, 1,268.8 meters (4,163 feet).

Glen Rio (Texas-New Mexico boundary, E. O. Heaton, 1921).—About three-fourths mile south of Glenrio, a town on the Chicago, Rock Island & Gulf Railway, on the Texas-New Mexico boundary, on the second small knoll south of the town, and in the boundary line fence near milepost no. 218 of the boundary survey. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 17.14 meters (56.2 feet) from station, in azimuth $179^{\circ}48'$; no. 2, 21.78 meters (71.5 feet), $0^{\circ}15'$. Elevation of station, 1,208.8 meters (3,966 feet).

Clark monument no. 9 (Texas-New Mexico boundary) (Texas-New Mexico State line, E. O. Heaton, 1921).—On the Texas-New Mexico boundary, about 15 miles south of Glenrio, on the north edge of the cap rock of the plains, about 10 meters (33 feet) south of the bluff, and 135 meters (443 feet) north of milepost no. 204. Station is marked by a concrete monument $2\frac{1}{2}$ feet high with plate in center stamped: Texas-New Mexico. Clark Monument No. 9, 1859.

Reestablished 1911, General Land Office, Boundary Commission. A standard reference disk set in hole in outcropping bedrock, note 12 (a), is 11.08 meters (36.4 feet) from station in azimuth $330^{\circ}53'$. Boundary post 204 of the Texas-New Mexico boundary is 135 meters (443 feet) from the station in azimuth $0^{\circ}04'$.

Supplementary points

Wellington water tank (Collingsworth County, E. O. Heaton, 1921).—A high, black tank—the municipal tank in the town of Wellington.

Shamrock water tank (Wheeler County, E. O. Heaton, 1921).—The municipal tank in the town of Shamrock—a high, black tank on the main street, about 100 meters north of the railroad.

Lark water tank (Carson County, E. O. Heaton, 1921).—A black water tank without legs located on the Chicago, Rock Island & Gulf Railway right-of-way at the town of Lark.

Claude M. E. Church spire (Armstrong County, E. O. Heaton, 1921).—The white spire on the Methodist Church at Claude, located about one-fourth mile southwest of the courthouse.

Claude courthouse (Armstrong County, E. O. Heaton, 1921).—The courthouse of Armstrong County, a grey stone building with black top located in the center of the town of Claude.

Conway latitude and longitude station (Carson County, W. B. Fairfield, 1920).—In the town of Conway, at the railway station, on the Chicago, Rock Island & Gulf Railway right-of-way, 18.91 meters (62.0 feet) south and 1.21 meters (4.0 feet) west of B.M. P 19, and 64.870 meters (212.83 feet) north and 684.177 meters (2,244.67 feet) east of station *Conway* (see description thereof). Marking not recorded.

Amarillo, Great West mill and elevator, light (Potter County, E. O. Heaton, 1921).—The combined mill and elevator of the Great West Mill & Elevator Co., about 2 miles east of Amarillo. It is a concrete structure with elevator in center projecting upwards to a height of about 150 feet.

Amarillo water tank (Potter County, E. O. Heaton, 1921).—The municipal tank at Amarillo, a high black tank near the northern edge of the business district, between Polk and Taylor Streets.

Amarillo post office (Potter County, E. O. Heaton, 1921).—A 3-story white building with red tile roof, located at the corner of Taylor and Eighth Street. Very prominent from all directions.

TEXAS-OKLAHOMA BOUNDARY ARC (PARALLEL OF $36^{\circ}30'$)

Principal points

Rabbit (Union County, N.Mex., C. M. Durgin, 1922; 1931).—On highest point of Rabbit Ear Butte, 6 miles northwest from Clayton, in rocky outcrop 12 meters (39 feet) northwest from the southeast edge of the top. Marked with a standard disk station mark in outcropping bedrock, note 2. In 1931 mark was found broken off and was replaced with a new mark. Reference marks are standard reference disks in rock, note 12. No. 1 is 11.315 meters (37.12 feet) from station, in azimuth $214^{\circ}57'$; no. 2, 8.205 meters (26.92 feet), $76^{\circ}42'$. Following azimuths are from station: *Texline, West Texas Utilities Co., water tank, finial*, $311^{\circ}10'16''$; *Clayton, municipal water tank (silver), finial*, $330^{\circ}09'53''$. In 1931 station was reached from railroad tracks northwest of Clayton 0.6 mile northwest on United States route no. 385, to point where highway turns left and crosses railroad; continue straight ahead 0.1 mile and turn right along a telephone line and go 7.2 miles to sharp turn to west. The fence on east side of road makes a right angle turn to west at this point. Go through wire gap in fence and southeast across open pasture toward highest point of butte. Truck can be driven to within 10 minutes walk of station. Elevation of station, 1,847.6 meters (6,062 feet).

Eklund (Union County, N.Mex., C. I. Aslakson, 1931).—About 6 miles north of Clayton, on highest point of two rocky buttes on top of a big mesa on the Eklund Ranch. A telephone line crosses the butte in a north-and-south direction. Station marked by a standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12 (a). No. 1 is 38.24 meters (125.5 feet) (slope distance) from station, in azimuth $197^{\circ}11'$; no. 2, 62.27 meters (204.3 feet) (slope distance), $76^{\circ}29'$. Other azimuths from station are: *Texline, West Texas Utilities Co., water tank* $321^{\circ}08'$.

52''; *Clayton, municipal water tank (silver)*, 8°09'50''. Station reached from Clayton, east on Main Street one block beyond end of pavement, then left and around end of group of sheds and across new railroad track, through gates in sheep lot onto road along telephone line. Continue along this road keeping to main traveled track 5.1 miles from sheep lot, to point just before reaching ditch across main track and a lone tree where a road leads off to left and up onto the mesa. Follow this road, keeping on left side of ditch to end of track at small shed, windmill, pond, and cattle pens. Go through gate at northeast corner of pens at small shed and bear southeast across pasture to highest point of butte. In wet weather go east $3\frac{1}{2}$ miles from Clayton on State Road No. 18 to gate on left; through gate and 1.4 miles to road leading north to small lone tree mentioned above.

Hoover (Union County, N. Mex., C. M. Durgin, 1922; 1931).—About 16 miles northeast of Clayton, $3\frac{1}{2}$ miles east and 2 miles south from Seneca post office on highest point of hill in western half of sec. 11, T. 27 N., R. 36 E., 120 meters (394 feet) west of fence, on land owned by O. T. Campbell. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). In 1931 the surface mark was found to have been destroyed, and a new surface mark described by note 1 (a) was set. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 9.396 meters (30.83 feet) from station, in azimuth 159°11'; no. 2, 10.965 meters (35.97 feet) 256°44'. Following azimuths are from station: *Clayton, municipal water tank, final*, 33°03'13''; *Texline, West Texas Utilities Co., water tank, final*, 351°11'11''. To reach station from Clayton go south on First Street, then east 3.2 miles on State Highway No. 18 to a turn to north, then north 10.8 miles to road to east at Roadway Store and Filling Station, thence east 3.0 miles, through a gate and south along section line 1.0 mile to fence corner just beyond a house, and from fence corner southeast 0.6 mile to highest point of hill and station. Elevation of station, 1,500.1 meters (4,922 feet).

Clay (Union County, N. Mex., C. M. Durgin, 1922; 1931).—One-half mile east of the town of Clayton, on high land 0.2 mile south of Stimson's Dairy, and 0.3 mile north of the Clayton-Texline highway (State Highway No. 18), between which and station a new railroad cut was reported in 1931, at which time the dairy buildings were reported as having been removed, there no longer being any buildings near the station. A new telephone line (1931) running north and south is about 250 yards east of station. Surface mark is standard disk station mark in bedrock, note 2. Reference marks are standard reference disks in rock, note 12. No. 1 is 22.958 meters (75.32 feet) from station, in azimuth 238°31'; no. 2, 27.682 meters (90.82 feet), 356°19'. Following azimuths are from station: *Texline, West Texas Utilities Co., water tank, final*, 305°41'03''; *Clayton, municipal water tank, final*, 57°34'42''. To reach station from Clayton go east on Main Street to railroad crossing at end of street, cross tracks and onto bank between north edge of cut and fence; continue eastward along fence to lane bearing northward; turn into lane and go to its end, then through gate and bear a little southeast one-fourth mile to station, which is about 40 meters (131 feet) west of north-and-south fence and about 100 meters (328 feet) north of an east-and-west fence. Elevation of station, 1,539.7 meters (5,051 feet).

School (Cimarron County, Okla., C. I. Aslakson, 1931).—About 10 miles (air-line), west by north of the town of Felt, about 2 miles south of the north fork of the Canadian River, 7 miles north and 3 miles east of the old State line, about one-fourth mile north and about 0.1 mile west of southeast corner of sec. 28, T. 2 N., R. 1 E., on public-school land, on a small knoll in pasture land, on highest ground in the vicinity. To reach station from Clayton, N. Mex., go south on First Street, one block from post office turn east on State Highway No. 18 and go 3.2 miles to where highway turns north, then north on highway 5.0 miles, east 7.0 miles, north along old State line 5.3 miles, east 1.0 mile to where main road turns north and dim road goes east through gate. Follow dim road along south side of fence 1.0 mile, jog through gap and continue east along north side of fence three-fourths mile, then bear left and go northeast about one-fourth mile to station on a small knoll. Surface mark is standard disk station mark in concrete, note 1(a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 4 inches above ground, is 3.64 meters (11.9 feet) north of intersection of fence lines and 0.20 meter (0.7 feet) west of north-and-south fence line, and approximately one-fourth mile from station, in azimuth 337°44'28''. No. 2 projects about 6 inches above ground, and is 150.98 feet from station, in azimuth 62°59'. Other azimuths

from the station are: *Texline, West Texas Utilities Co., water tank, final*, $14^{\circ}25'36''$; *Clayton, municipal water tank, final*, $49^{\circ}58'00''$.

Worsham (Dallam County, C. I. Aslakson, 1931).—About 5 miles (airline) north of Texline, Tex., about 2 miles east of west boundary line of Texas, about $3\frac{1}{2}$ miles south of north boundary of Texas, on land belonging to Carl Worsham of Henrietta, Tex., and occupied by Joe Cluck, in an east-and-west fence line, 287.4 feet southeast of southeast corner of brick foundation to white house, and 11.4 meters (37 feet) west of a north-and-south fence. Station reached from Texline by going westward 2 blocks from flagpole and street light to a road to north; turn right on this road and go northeast and north 4.75 miles to a road to east through a wire gate; go through gate and eastward to a 2-story white farmhouse and station as above. Surface and underground marks are standard disk station marks in concrete, note 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north-and-south fence line at north end of gate, about 9 feet north of an east-and-west fence, and 0.25 mile (speedometer) from station, in azimuth $358^{\circ}23'18''$. No. 2 is in an east-and-west fence line, 25.405 meters (83.35 feet) from station, in azimuth $90^{\circ}33'$. Other azimuths from station: *Booster station, black water tank, final*, $139^{\circ}14'17''$; *Clayton, municipal water tank (silver), final*, $88^{\circ}53'59''$.

Felt (Cimarron County, Okla., C. I. Aslakson, 1931).—About 3 miles north and $1\frac{1}{2}$ miles east of town of Felt, about one-half mile north of the north fork of the Canadian River (shown on some maps as the Beaver River), about 0.1 mile west and 0.4 mile north of the southeast corner of sec. 30, T. 2 N., R. 3 E., on a small knoll, the highest point in the vicinity, in pasture land. Station reached from Felt east on road that is south of elevator, 0.35 mile to section line road to north; north $3\frac{1}{2}$ miles to section line road intersection at point where all sections are under cultivation, and only section to southeast is fenced; there turn east on north side of fence and go 0.85 mile to gate and cattle guard to south; go south through fence then bear a little east of south and go 0.6 mile to knoll and station. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). Both project about 2 inches above surface. No. 1 is 89.82 feet from station, in azimuth $73^{\circ}48'$; no. 2 is 8.0 meters (26 feet) west of cattle guard, 0.24 meter (0.8 foot) south of fence line, and approximately 0.6 mile from station, in azimuth $167^{\circ}47'12''$.

X.I.T. (Dallam County, C. I. Aslakson, 1931).—About 14 miles northeast of Texline, Tex., on land known as the old X.I.T. Ranch, on a north-and-south road 6.4 miles south of a small bridge just south of Felt, Okla., 2.4 miles south of the Oklahoma-Texas boundary line, on east side of road, one-fourth mile east of the old F.D.W. ranch house and buildings. Reached from Texline by going southeast on United States route 385 from Gulf filling station one block to Magnolia filling station, there turning left and going 0.4 mile; turn right and go 7.6 miles, passing a galvanized-iron building at 0.3 mile and a small culvert or bridge at 3.3 miles; turn north at T-intersection and go 0.4 mile, then east 5.5 miles, then north 4.0 miles, east one-fourth mile, and north $1\frac{1}{4}$ miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot west of fence line on east side of road, and 0.2 mile (speedometer) from station, in azimuth $0^{\circ}16'38''$; no. 2 is 1 foot east of fence line on west side of road, and 17.765 meters (58.28 feet) from station, in azimuth $92^{\circ}52'$. Azimuth from station of tip of vertical shaft of windmill distant approximately one-fourth mile is $89^{\circ}13'06''$.

Harmer (Cimarron County, Okla., C. I. Aslakson, 1931).—About $3\frac{1}{2}$ miles (airline), southeast of Harmer, a station on the Santa Fe Railroad, about $9\frac{1}{2}$ miles southwest of Boise City, about 1 mile south of the north fork of the Canadian River, on a slight rise in uncultivated ground in the northwest corner of sec. 26, T. 2 N., R. 4 E. To reach station from Boise City go west from courthouse square 0.2 mile, south three-fourths mile, west 2.0 miles, south 5.8 miles to wire gate on west side of road. Go through gate and follow road across prairie southwest and south, west and southwest for $2\frac{1}{2}$ miles to small ranch house. Go through gate to southwest of house and follow road to westward 1.2 miles to wire corral that is about 100 yards south of a section line fence. At corral turn to left and go about 0.35 mile to southwest to station on high ground. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with ground, 3.4 meters (11 feet) west of west side of wire gate,

0.17 meter (0.6 foot) south of fence line, and approximately 0.5 mile from station, in azimuth $207^{\circ}23'40''$. No. 2 projects about 4 inches above ground, and is 99.33 feet from station, in azimuth $320^{\circ}57'$. Azimuth from station of *Boise City, Cimarron Utilities Co., tank*, is $212^{\circ}08'39''$; *grain elevator, south gable*, $131^{\circ}59'03''$.

Schellenberg (Dallam County, C. I. Aslakson, 1931).—About 23 miles northeast of Texline, Tex., on highest part of ridge, in pasture land belonging to A. L. Schellenberg, 0.3 mile west of section line road, 307.5 feet south of a north-and-south fence. To reach station from Texline, go southeast on route 385 from Gulf filling station one block to Magnolia filling station, turn left and go 0.4 mile, right 7.6 miles, passing galvanized-iron building at 0.3 mile and small culvert bridge at 3.3 miles, to T-intersection. From this point continue east for 3.0 miles, turn left and go 0.5 mile, right 7.0 miles to dim road leading north; turn left on dim section-line road and go 2.0 miles to a T-intersection with a dim section-line road running east and west along south side of fence. Turn west and go 0.3 mile along fence, thence south 307.5 feet to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on ridge southwest of station, 30.40 meters (99.7 feet) from station, in azimuth $10^{\circ}23'$. No. 2 is 1 foot south of east-and-west fence, north of the north end of a north-and-south fence, and 0.3 mile (speedometer) from station, in azimuth $260^{\circ}12'38''$. Other azimuths from station are: *Rabbit Ear Butte, northernmost peak, tip*, $95^{\circ}59'57''$; chimney, center of brown bungalow, distant approximately 1 mile, $192^{\circ}21'33''$.

Rogers (Cimarron County, Okla., C. I. Aslakson, 1931).—About 10 miles southeast of Boise City, about 1 mile south of the north fork of the Canadian River, in the SE $\frac{1}{4}$ sec. 28, T. 2 N., R. 6 E. Station reached from Boise City by going west 0.2 mile from courthouse square, south three-fourths mile, west 2.0 miles, south 9.0 miles, to gate to east into land to east at section line, through gate and along section lines on dim road 7.0 miles, then north on west side of wire fence 1.0 mile, east through gate and 0.65 mile along north side of fence, then northward 0.3 mile to station on high ground. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 5 inches above ground, is 0.82 feet north of east-and-west fence line, and is approximately 0.3 mile from station, in azimuth $356^{\circ}35'41''$. No. 2 projects about 2 inches above ground, and is 67.44 feet from station, in azimuth $113^{\circ}04'$. Other azimuths from the station are: *Elevator, SW. gable*, distant 6 miles, $308^{\circ}21'49''$; *Grain elevator, south gable*, distant 13.5 miles, $101^{\circ}53'08''$; *Boise City, Cimarron Utilities Co., tank*, $146^{\circ}53'24''$.

Sneed (Dallam County, C. I. Aslakson, 1931).—About 32 miles east by north from Texline, Tex., $3\frac{1}{2}$ miles south of the Texas-Oklahoma State line, on the Sneed Ranch, on a small ridge on which ranch house is located, about 30 paces north of fence line back of chicken house, and 50 paces east of fence along front of ranch house. To reach station from Texline, go south on United States route 385 from Gulf filling station on corner one block to a Magnolia filling station, turn left and proceed as follows: At 0.4 mile jog right; at 0.7 mile road curves east at a galvanized iron building; at 4.4 miles cross small culvert and continue east to a T-intersection at 8.00 miles; jog north 0.4 mile; turn east and continue on main road to 18.0 miles; jog right one-fourth mile; go east 3.0 miles and jog north one-half mile, and continue east 7.0 miles to road turning out to north; continue east 4.0 miles to T-intersection; turn south and go 1 mile to road turning out to east; turn into this road and go 3.0 miles to gate and end of fence on north side of road; pass through gate and continue 2.0 miles to road turning out to north; turn left on this road and proceed to windmill and thence east to ranch house and station. Reached also from Boise City, Okla., south on United States route 41, 4.5 miles from State line, to road turning out to east and thence as described above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 0.25 mile from station, in azimuth $279^{\circ}53'54''$; no. 2, 26.825 meters (88.01 feet), $353^{\circ}59'$. Azimuth from station of tip of windmill, distant one-half mile, is $260^{\circ}36'10''$.

Mooney (Cimarron County, Okla., C. I. Aslakson, 1931).—About 19 miles, air line, southeast by east of Boise City, about 6 miles, air line, north of Kerrick, in the NW $\frac{1}{4}$ sec. 5, T. 1 N., R. 8 E. Station reached from Griggs post office (about 20 miles west-northwest of Texhoma), by going west 6.0 miles, south 1.0 mile along section line fence, then southeast 0.3 mile to station on high ground.

Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 12 inches above ground, and is 72.48 feet from station, in azimuth $41^{\circ}56'$; no. 2 projects about 6 inches above ground, is 54.2 feet southwest of southwest corner of house, 1.2 feet west of fence line, and approximately 0.5 mile from station, in azimuth $159^{\circ}18'03''$. Other azimuths from the station are: *Stratford, West Texas Utilities Co., water tank*, $333^{\circ}21'32''$; elevator, SE. gable, approximately 6 miles SE. of station Rogers, $6^{\circ}43'31''$; *Boise City, Cimarron Utilities Co., tank*, $122^{\circ}03'54''$.

Kerrick (Dallam County, C. I. Aslakson, 1931).—About 15 miles northwest of Stratford, 3.1 miles south from the general store (stucco) in the small village of Kerrick, on a small ridge west of the Stratford-Kerrick road, on land belonging to the Dallas News. From Kerrick go south 3.1 miles from store to top of ridge and station in pasture 409 feet west of fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot west of fence line, 65 feet west of center line of road, and 556.4 feet from station, in azimuth $226^{\circ}58'45''$; no. 2 is 1 foot west of fence line, 65 feet west of center line of road, 45 feet west of west edge of borrow pit, and 0.38 mile (speedometer) from station, in azimuth $348^{\circ}00'23''$. Other azimuths from station; Kerrick, northwest gable of grain elevator, $184^{\circ}26'30''$; tip, windmill vertical shaft, distant 1 mile, $257^{\circ}49'22''$.

Griggs (Cimarron County, Okla., C. I. Aslakson, 1931).—Three and one-half miles east and one-half mile south of Griggs, $1\frac{1}{2}$ miles west of east boundary of Cimarron County, on the half section line about 100 yards west of center of sec. 35, T. 2 N., R. 9 E. Reached from Griggs east 3.0 miles along section line road, south 0.5 mile, then east 0.4 mile to station on high ground. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with surface, 30 feet south of center of section line road, and approximately 0.5 mile from station, in azimuth $178^{\circ}28'17''$; no. 2, projects about 2 inches above ground, and is 485.8 feet from station, in azimuth $270^{\circ}25'36''$. Other azimuths from station are as follows: *Texhoma, Cimarron Utilities Co., water tank, final*, $292^{\circ}12'08''$; *Stratford, West Texas Utilities Co., water tank, final*, is $1^{\circ}56'22''$.

O'Brien (Sherman County, C. I. Aslakson, 1931).—About 8 miles north of Stratford, Tex., 16 miles west by south of Texhoma, Okla., on the south bluff line of the north fork of the Canadian River (Beaver Creek) on land owned by J. C. O'Brien. To reach station from Texhoma go west 16.0 miles from railroad crossing on Main Street; this road follows the State line. At sign "16 miles Texhoma" turn south across cattle guard and follow winding road across river 4.8 miles to cattle guard with red gate on west side; here turn sharply to north along wire fence leading in front of a ranch house, and go 0.9 mile to station on east side of fence near bluff line. Station is 0.1 mile north-northeast of fence corner, 138 feet east of fence and 145 feet south of edge of bluff. Reached from Stratford by going north on Main Street 1 block beyond end of pavement, east 0.7 mile, and north 7.0 miles to cattle guard and red gate. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of fence, 0.15 mile south of fence corner, and 0.25 mile (speedometer) from station, in azimuth $5^{\circ}45'41''$; no. 2, 1 foot east of fence, 40 yards south of edge of bluff, and 50.11 meters (164.4 feet) from station, in azimuth $124^{\circ}45'$. Azimuth from station of *Stratford, West Texas Utilities Co., water tank, final*, $3^{\circ}34'02''$; *Texhoma, Cimarron Utilities Co., water tank, final*, $258^{\circ}03'28''$.

Mouse (Texas County, Okla., C. I. Aslakson, 1931).—About 9 miles, airline, northwest of Texhoma, 10 miles east and one-half mile north of Station Griggs, in southeast corner of SW. $\frac{1}{4}$ sec. 28, T. 2 N., R. 11 E., 1.0 foot west of north-and-south fence line, and 63.63 feet north of east-and-west fence. To reach from Texhoma go west from Texhoma Hotel 0.8 mile, north $1\frac{1}{4}$ miles, west 2.0 miles, north 4.0 miles, west 3.0 miles, north 1.0 mile, then east 0.5 mile to station. Surface mark is standard disk station mark in concrete, note 1 (a), no underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 2 inches above ground is 1.1 feet west of north-and-south line, and 104.00 feet from station, in azimuth $179^{\circ}32'$; no. 2 is flush with surface of ground, 69 feet east of north-and-south section line road, 45.38 feet east of northwest corner post of fence line, 2.85 feet south of east-and-west fence line, and approximately 0.5 mile from station, in azimuth $88^{\circ}36'49''$. Other

azimuths from the station are: *Texhoma, Cimarron Utilities Co., water tank*, $321^{\circ}47'11''$; *Texhoma, Riffe's grain elevator*, $324^{\circ}46'28''$; house chimney, distant 1 mile, $11^{\circ}39'22''$.

Elliot (Laplace) (Sherman County, C. I. Aslakson, 1931).—About 13 miles northeast of Stratford, Tex., 3 miles north-northeast of Stevens, Tex., 3 miles south of the Texas-Oklahoma State boundary, on land belonging to Ezra Elliot of Pratt, Kans., and in an east-and-west fence line, 22.33 meters (73.3 feet) west of the corner. To reach station from Texhoma, Okla., go west from the Rock Island depot 6.0 miles along road which follows the boundary; turn south onto dirt road with one-wire phone line along it and go 2.0 miles to ranch house at end of phone line; pass through gate and continue south 1.0 mile to section line fence and station. Station also reached from United States route no. 54 by going through red iron pipe and wire gate and across railroad tracks 1.8 miles northeast of Stevens; then north along the east side of section line fence 0.8 mile, cross over and go 1.0 mile north along west side of fence to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence corner, 56.87 meters (186.6 feet) from station, in azimuth $203^{\circ}50'$; no. 2 is 1 foot west of fence line, and 0.3 mile (speedometer) from station, in azimuth $357^{\circ}34'38''$. Other azimuths from station are: *Texhoma, Cimarron Utilities Co., water tank, final*, $244^{\circ}46'59''$; *Stratford, West Texas Utilities Co., water tank, final*, $47^{\circ}59'16''$.

Whorton (Texas County, Okla., C. I. Aslakson, 1931).—Seven miles north and 3 miles east of Texhoma, one-half mile north and $5\frac{1}{2}$ miles west of Goodwell, about 250 yards southeast of a small abandoned shack which is about one-fourth mile west of northeast corner of sec. 35, T. 2 N., R. 12 E. To reach station from Texhoma, go 2 blocks south of railroad on main street, to where United States Highway 54 goes east, turn east on highway and follow it northeast along railroad 5.2 miles, then on left fork across railroad and north on township line road 4.0 miles, then west along section line 1.3 miles to old shack, then southeast 250 yards to high ground and station. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 2 inches above ground, is on the projection of the east-and-west fence line, 3.8 feet east of northeast corner of fence, and 543.45 feet from station, in azimuth $48^{\circ}09'17''$; no. 2 projects about 2 inches above ground, is 47.8 feet north of center line of section line road, 1.2 feet north of fence line, and approximately 0.25 mile from station, in azimuth $159^{\circ}57'02''$. Azimuth from station to *Goodwell, municipal water tank*, is $274^{\circ}51'33''$.

Hardy (Sherman County, C. I. Aslakson, 1931).—About $3\frac{1}{2}$ miles south-southwest of Texhoma, Okla., 3 miles south of the Texas-Oklahoma State boundary, on high ground, on land belonging to J. B. and J. T. Hardy of Greensburg, Kans. Station is 0.15 mile south of road, 8.75 meters (28.7 feet) east of a north-and-south fence, and 6.30 meters (20.7 feet) northwest of the northeast corner post of a wheat piling lot. Station is reached from Texhoma as follows: From yellow brick schoolhouse in southwest part of town, go south 2.5 miles, then west 1.0 mile, to first house on south side of road (a bungalow with chimney in center of peaked roof); continue past house to first fence running south; go through fence at northeast corner of pasture lot and continue on southwest to wheat piling lot and station as described. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north-and-south fence line, about 75 yards south of a corner, 190 yards south of center line of road, and 0.21 mile (speedometer) from station, in azimuth $260^{\circ}40'59''$; no. 2 is in north-and-south fence line, 0.1 mile south of center line of road, and 32.15 meters (105.5 feet) from station, in azimuth $164^{\circ}31'$. Azimuth from station of *Texhoma, Cimarron Utilities Co., water tank, final*, is $203^{\circ}55'17''$.

Camp (Texas County, Okla., C. I. Aslakson, 1931).—About 2 miles northeast by east of Goodwell, in the southwest corner of sec. 30, T. 2 N., R. 14 E. To reach station from Goodwell railroad station, cross railroad, turn left on highway and go northeast 1.3 miles to section line road to east; go east 0.6 mile to station in farmyard about 100 yards north of road intersection. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 2 inches above ground, is 41 feet east of center line of road, 2.0 feet west of north-and-south fence on projection of east-and-west fence line, and 213.30 feet from

station, in azimuth $179^{\circ}23'$. No. 2 projects about 4 inches above ground, is 230 feet east of intersection of Highway No. 54 and section line road, 111 feet south-east of center line of highway, 33.5 feet north of center line of road and approximately 0.5 mile from station, in azimuth $83^{\circ}04'45''$. Other azimuths from the station are as follows: Small black tank, distant approximately three-fourths mile, $51^{\circ}43'55''$; Goodwell, municipal water tank, $70^{\circ}54'45''$; Guymon, black, municipal standpipe, center, $231^{\circ}41'01''$.

Graham (Hansford County, C. I. Aslakson, 1931).—About 12 miles east by south of Texhoma, Okla., 2 miles east of the Sherman-Hansford County line, 3 miles south of the Texas-Oklahoma line, on the south bluff of the Frisco Creek, on land owned and occupied by Tom Graham. Station reached from Texhoma as follows: Turn due east off United States route 54 onto road along State line which passes along the north side of the Foxworth-Galbraith Lumber Co.'s buildings; continue due east 10.3 miles to right turn; take turn and continue across Frisco Creek 3.5 miles to left turn, to where a dim unimproved road leads straight ahead. This point is 0.5 mile south of the creek crossing. A mail box and gate with large blunt arrow on board on gate post are located on the right at turn. Follow dim road 1.0 mile to fence corner, turn west along south side of fence and go 0.5 mile to fence corner and northwest corner of cultivated field, then south 0.5 mile along east edge of half section of sod land; west 0.5 mile along south edge of sod land to fence, north along east side of fence, 0.5 mile to corner, and 0.2 mile west of corner to station, 14 meters (46 feet) north of east-and-west fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an east-and-west fence line, 31.32 meters (102.8 feet) from station, in azimuth $297^{\circ}38'$. No. 2 is in an east-and-west fence line, 0.3 mile (speedometer) from station, in azimuth $89^{\circ}50'53''$. Azimuth from station of Texhoma, Cimarron Utilities Co., water tank, final, $105^{\circ}50'18''$.

Bridgeman (Texas County, Okla., C. I. Aslakson, 1931).—About 12 miles, airline, east by north from Goodwell, about 6 miles, airline, southeast of Guymon, about 0.8 miles south-southwest of Liberty schoolhouse, about 75 yards southwest of a 2-story unpainted house, 0.3 mile north of southwest corner of sec. 26, T. 2 N., R. 15 E., 29 feet east of center line of section line road, 122.3 feet south of the northwest corner of pasture, and 0.17 foot west of fence line. Surface mark is standard disk station mark in concrete, note 1 (a), projecting 1 inch above surface of ground. No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 6.0 feet northwest of southeast corner of section line fence, and approximately 0.3 mile from station, in azimuth $3^{\circ}09'41''$. No. 2 is 82 feet west of center line of section line road, 49.2 feet west of northeast corner of pasture, 0.50 foot north of east-and-west fence line, and 117.18 feet from station, in azimuth $109^{\circ}32'$. Both marks project about 1 inch above surface of ground. Other azimuths from the station are: Goodwell, municipal water tank, $86^{\circ}08'51''$; Perkins district school, flagpole, distant 3 miles, $117^{\circ}07'31''$; Guymon black municipal standpipe, center, $148^{\circ}43'08''$. To reach from Guymon, go south to end of Main Street, turn east and go 0.35 mile, turn south on well-traveled road 3 miles, then turn east and go 3 miles, again turn south and go 1.7 miles to station site.

Chipperfield (Hansford County, C. I. Aslakson, 1931).—Thirteen miles north of Gruver, $5\frac{1}{2}$ miles north-northwest of Bernstein, $5\frac{1}{2}$ miles southwest of Hitchland, 3 miles south of the Texas-Oklahoma State line, on land belonging to Clara Chipperfield. To reach station from Texhoma, Okla., turn due east off United States route 54 onto road along Texas-Oklahoma line which passes along the north side of the Foxworth-Galbraith Lumber Co.'s buildings, continue due east 10.3 miles; take right turn and continue across Frisco Creek 3.5 miles to left turn, 0.5 mile south of creek crossing; go east on main road 3.0 miles; south 8.0 miles; east 6.0 miles; north 5.0 miles to schoolhouse; east 1.0 mile, then north 1.0 mile to gate; pass through gate and go 0.8 mile to gate just west of ranch house; pass through gate and continue north to corner, then west along an east-and-west fence 0.75 mile to station, which is 1 foot north of fence. This fence has a one-wire telephone line attached to extensions to the fence posts. Station can also be reached from Bernstein (Rock Island Railroad station) by going north 2.0 miles on State road no. 88, then west 2.0 miles to point 1.0 mile east of schoolhouse mentioned above, thence to station as described above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot north of east-and-west fence line, 73.57 meters (241.4 feet) from station, in azi-

mouth 269°49'. No. 2 is in fence corner, near south edge of bluff, and approximately 0.4 mile from station in azimuth 177°46'09''. Azimuths from station: *Goodwell, municipal water tank*, 125°31'30''; *Hitchland, railroad water tank, final*, 240°00'18''; *Guymon, black municipal standpipe, center*, 164°40'29''.

Wall (Texas County, Okla., C. I. Aslakson, 1931).—About 15 miles, airline, east-southeast of Guymon, about 3½ miles southwest by west of Hardesty, about 1½ miles south of Coldwater Creek, on a rise in the ground, in pasture land belonging to Earl Wall, in the central part of sec. 32, T. 2 N., R. 17 E. Station reached from Guymon south on Main Street to end of street, east 11.3 miles, south 4 miles, east 3 miles, south 1 mile, and west through gate and on wagon road along section line 2 miles to gate in fence to south. Go south through gate, turn southeast and go 0.4 mile to rise in ground and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an east-and-west fence line which passes about 200 yards north of station, and is about 0.4 mile from station, in azimuth 255°43'36''. No. 2 is 101.46 feet from station, in azimuth 21°01'. Other azimuths from station: *Hardesty, grain elevator, north gable*, 254°58'38''; *Guymon, black municipal standpipe, center*, 114°28'33''.

Browder (Hansford County, C. I. Aslakson, 1931).—About 8 miles north-northeast of Bernstein, Tex., ¾ miles southeast of Hitchland, 2¼ miles south of the Texas-Oklahoma State line, on property owned by R. H. Browder. To reach station from Hitchland go east from railroad crossing 1.3 miles to turn, and continue on main road south 0.8 mile; then 0.8 mile east; then 1.5 miles south to station, 9 meters (30 feet) west of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north-and-south fence, 10¼ meters (34 feet) east of center line of road, and 19.46 meters (63.8 feet) from station, in azimuth 252°30'. No. 2 is 1 foot west of north-and-south fence on east side of road, 5 feet south of a T-intersection of fences (possibly a section corner), and 0.5 mile (speedometer) from station, in azimuth 358°12'31''. The azimuth from station of *Hitchland, railroad water tank, final*, is 136°10'19''.

Barnes (Texas County, Okla., C. I. Aslakson, 1931).—At the southwest corner of road intersection, on land owned and occupied by Wallace Barnes, 150 feet north of his house, in sec. 34, T. 2 N., R. 18 E., 60 feet west of center line of north-and-south road, 80 feet south of center line of east-and-west road, and 110 feet southwest of corner stone at intersection of crossroads. From Hardesty go east to point 2.3 miles east of railroad crossing where trunk line turns south; thence south 1 mile, then east 3 miles to road intersection and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 45 feet northwest of center of crossroads, 5.4 feet from intersection of fence lines, and 119.9 feet from station, in azimuth 194°03'. No. 2 is just south of fence line, and about 0.25 mile from station, in azimuth 92°18'02''. Azimuth from station of *Hardesty, grain elevator, southwest corner*, is 99°16'55''.

Hogland (Ochiltree County, C. I. Aslakson, 1931).—About 13 miles northwest of Perryton, Tex., 3 miles east of the Hansford-Ochiltree County line, 3 miles south of the Texas-Oklahoma State line, 39.95 feet west of a north-and-south fence line, 48.4 feet west-southwest of the northwest corner of a cultivated field on east side of the north-and-south fence line. To reach from Perryton, take Main Street (U S 83) north 2.0 miles from point where the highway crosses railroad tracks in Perryton, go west 8.0 miles, north 1.4 miles, west 2.1 miles, north 0.4 mile, west 2.7 miles to gate and station site. Surface mark consists of standard disk station mark in concrete, note 1 (a), projecting 8 inches above ground. No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 8 inches above ground, is on the south side of road, 2.1 feet west of north-and-south fence line, and 1.4 feet south of east-and-west fence line, and approximately 0.4 mile from station, in azimuth 268°59'27''. No. 2 projects about 6 inches above ground, is 1.1 feet west of north-and-south fence line, and 119.77 feet from station, in azimuth 340.7°. Azimuth from station to *Perryton, municipal water tank, final*, is 286°08'27''.

Mitchusson (Beaver County, Okla., C. I. Aslakson, 1931).—About 7 miles east of the Texas-Beaver County line, 7 miles north of the old Texas-Oklahoma State line, 14 miles north and 1¼ miles west of Perryton, Tex., 18.2 miles east and 1 mile south of Hardesty, on uncultivated land belonging to J. U. Mitchusson of Goodwell, near the north edge of a small cultivated patch, 44 feet east of the center of United States route 83, and 7 feet east of fence line. Reached from

Perryton north 7 miles on United States route 83 to old State line, west 0.4 mile, north 0.4 mile, west 1 mile, then north 3.1 miles to station on east side of road and 0.1 mile north of section line road intersection. To reach station from Hardesty go east 2.3 miles, south 1 mile, east 3 miles, south 4 miles, east 0.7 mile to Range, and continue on east from Range 8.3 miles, then south 1 mile, east 6 miles, and north 5 miles to crossroad and station 0.1 mile north of crossroads. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 1 inch above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 2 inches above ground, is 3.25 feet southeast of fence line intersection, 38 feet east of center of United States route 83, and 0.4 mile from station in azimuth $179^{\circ}43'59''$. No. 2 projects 1 inch above ground, 40 feet west of center of United States route 83, 1 foot west of fence line, and 80.95 feet from station, in azimuth $89^{\circ}18'$. Other azimuths from station are: Windmill of farm house one-fourth mile distant, $353^{\circ}27'$; Perryton, municipal water tank (silver), final, $354^{\circ}39'05''$; Hardesty, grain elevator, southwest corner, $92^{\circ}16'21''$.

Campbell (Ochiltree County, C. I. Aslakson, 1931).—About $7\frac{1}{2}$ miles northwest of Perryton, 10 miles east of the Hansford-Ochiltree County line, 2 miles south of Texas-Oklahoma State line, on land owned and occupied by H. B. Campbell. To reach station from Perryton go north on United States route 83, 4.6 miles from railroad crossing; turn left (west) on graded dirt road and continue west 5.7 miles to white ranch house with red windmill and shed in barnyard on right of road; station is in southeast corner of pasture land, 37.82 meters (124.1 feet) west of southwest corner of house and $33\frac{1}{4}$ meters (109 feet) north of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot north of fence, 9.6 meters (31 feet) north of center line of road, and 23.65 meters (77.6 feet) from station, in azimuth $359^{\circ}35'$. No. 2 is north of road, 1 foot north of fence, about 35 feet east of fence corner, and 0.48 mile (speedometer) from station, in azimuth $88^{\circ}22'17''$. Azimuth from station of Perryton, municipal water tank (silver), final, is $309^{\circ}40'59''$.

Shadwick (Beaver County, Okla., C. I. Aslakson, 1931; 1934).—About $1\frac{1}{2}$ miles north and 4.1 miles east of Perryton, Tex., 3 miles southwest of Balko village, 30.9 feet south of east-and-west fence, and 300 feet west of lane on highest part of low-rounded hill in pasture owned by J. R. Shadwick and leased by D. E. Penner. To reach station from Perryton, go north on United States route 83 to old State line 7 miles, east 0.6 mile, north 3 miles, east 3.8 miles, north 4 miles, west 0.5 mile to lane mentioned above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). Both marks project about 3 inches. No. 1 is on west edge of lane, in fence line, and 317.7 feet from station in azimuth $299^{\circ}13'$. No. 2 is in fence corner, 0.4 mile from station in azimuth $41^{\circ}39'47''$. Other azimuths from station: Red windmill on farm, distant 2 miles, $342^{\circ}27'47''$; Perryton, municipal water tank (silver), final, $16^{\circ}16'08''$. In 1934 station reached from Balko village, west 2 miles, south 2 miles, then west 0.5 mile to narrow lane running north, 0.15 mile north on lane, and 300 feet northwest to station site.

Morris (Ochiltree County, C. I. Aslakson, 1931).—About 9 miles west of Booker, Tex., $7\frac{1}{2}$ miles northeast of Perryton, Tex., 2 miles south of the Texas-Oklahoma State line, on land owned and occupied by Mrs. Ollie Morris, in southwest corner of a pasture lot, 5.50 meters (18.0 feet) south of a yard fence, and 12.60 meters (41.3 feet) east of center line of road. Reached from Perryton northeast on road south of railroad tracks 5.6 miles from United States route no. 83 (Main Street of Perryton) to a road leading north across the railroad tracks; this road is just east of concrete culvert 52A under railroad. Continue north 2.2 miles to a small white house and large red barns on east side of road, and to station as described above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot north of an east-and-west fence, about 100 feet west of a fence corner, and 0.45 mile (speedometer) from station, in azimuth $271^{\circ}47'08''$. No. 2 is 1 foot north of fence, 8.50 meters (27.9 feet) east of center line of road, and 20.96 meters (68.8 feet) from station, in azimuth $354^{\circ}19'$. Azimuth from station of Perryton, municipal water tank (silver), final, $45^{\circ}56'30''$; Booker, municipal water tank (black), final, $278^{\circ}11'37''$.

Pruett (Beaver County, Okla., C. I. Aslakson, 1931; 1934).—Ten miles, airline, north of Booker, Tex., 9 miles east and 2 miles south of Balko, Okla., on land

For notes in regard to marking of stations see p. 154.

owned by Levy Pruett, in SE $\frac{1}{4}$ sec. 25, T. 2 N., R. 23 E., in right-of-way fence, 30 feet north of center line of road, and 41 feet west of fence corner. To reach from Booker, from north end of Main Street east 0.5 mile to where road turns north, north 3 miles to old State line, then along old State line east 0.5 mile, north 7 miles, and then west 0.3 mile to station on north side of road. To reach from Beaver, Okla., go south on route 35, 13 miles to where highway turns east, continue south from this point 1 mile to road leading west and go west on this road 0.25 mile to top of hill and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with ground, in north-and-south fence, 115 feet north of fence corner which is east of station, and 120.92 feet from station in azimuth 198°40'. No. 2 projects 6 inches, is in right-of-way fence on south side of the east-and-west road, 35 feet south of center line of this road, and 0.2 mile from station in azimuth 86°56'50''. Azimuth from station of *Booker, municipal water tank (black), finial*, is 3°43'17''; school, finial (district school no. 25), is 185°53'54''.

Booker (Lipscomb County, C. I. Aslakson, 1931).—About one-half mile north of railroad station at Booker, 2½ miles south of the Texas-Oklahoma State line, on land belonging to Mr. Kimmel, groceryman in Booker, 1 foot east of a north-and-south fence, 77.50 meters (254.3 feet) south of center line of road, and about 0.15 mile southwest of road intersection. To reach station from Booker go east 0.4 mile from Main Street along road just south of railroad to point where road turns north across tracks; turn north and go 0.5 mile to crossroads; turn west and go 0.1 mile to first north-and-south fence and station as described above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is north of road, by first telephone pole east of crossroads, and 0.15 mile (speedometer) from station, in azimuth 250°57'21''. No. 2 is 1 foot south of fence, 8.50 meters (27.9 feet) south of center line of road, 6.35 meters (20.8 feet) west of fence corner, and 69.99 meters (229.6 feet) from station, in azimuth 174°39'. Azimuth from station to *Booker, municipal water tank (black), finial*, is 25°43'16''.

Carbin (Beaver County, Okla., C. I. Aslakson, 1931).—Station is 9¼ miles north and 11 miles east of Booker, Tex., 1¼ miles north and 7 miles west of Logan (store and post office), one-fourth mile south of northwest corner of sec. 35, T. 2 N., R. 25 E., 27 feet east of center line of road, 1 foot west of fence line, and on property of Mr. Carbin, whose house is about one-fourth mile to northeast. To reach station from Follett go north 6.6 miles to Trunk Line road, west 11.5 miles to short jog to north; north on narrow road 4.5 miles to station. From Booker go north 3 miles to old State line, east 0.5 mile, north 3 miles, east 5 miles, north 0.75 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 3 inches above ground, is 27 feet west of center of road, 1 foot east of fence line, and 88.09 feet from station, in azimuth 35°58'. No. 2 projects 4 inches above ground, is 30 feet west of center of road, 0.4 foot west of fence line, and 0.2 mile from station, in azimuth 176°17'18''. Other azimuths from station are: *Follett, municipal water tank (black), finial*, 315°46'33''; *Booker, municipal water tank (black), finial*, 47°31'45''.

Kirschman (Lipscomb County, C. I. Aslakson, 1931).—About 6½ miles east-by-south of Booker, 1¼ miles east-northeast of Gaylord elevator, 7 miles east of the Ochiltree-Lipscomb County line, 2½ miles south of the Texas-Oklahoma State line, on land owned and occupied by D. O. Kirschman. Reached from Booker east 0.5 mile, left across railroad tracks 0.5 mile to cross-grade east 5.0 miles, south 1.0 mile to crossroads, to point 0.5 mile north of elevator at Gaylord railroad station. From here go east 1.0 mile to pink stucco house on north side of road; at this point power-line poles change from north side to south side of road. Turn south along section line road on east side of fence and go 0.15 mile to station, which is about 2 feet east of fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of fence south of road, 0.25 mile east of pink stucco house, and 0.3 mile (speedometer) from station, in azimuth 237°01'37''. No. 2 is 1 foot east of fence, and 39.98 feet from station, in azimuth 0°45'. Azimuth from station of *Follett*,

municipal water tank (black), finial, 274°18'52''; Booker, municipal water tank (black), finial, 94°02'02''. In 1934 reference mark no. 1 was reported destroyed by road construction.

Ivanhoe (Beaver County, Okla., C. I. Aslakson, 1931).—In the southwest corner of the North Ivanhoe schoolhouse yard, 4 miles south and 6 miles west of Spearman, 1¼ miles east and 8 miles north of Follett, Tex., 44 feet north of fence line, 37 feet east of another fence line, and 179 feet west of schoolhouse. Station reached from Follett from second street crossing north of post office, east 0.5 mile, north 3 miles, east 1 mile, north 1.5 miles to old State line, east on old State line 0.3 mile to section-line road to north, and north 3.5 miles to schoolhouse on west side of road and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 3 inches above ground, is 2 feet northwest of fence corner, 36 feet west of center of road, 150 feet north of schoolhouse, and 226.2 feet from station, in azimuth 238°28'. No. 2 projects 6 inches above ground, 32 feet west of center of road, 1 foot east of fence line, and 0.2 miles from station, in azimuth 350°53'16''. Azimuth from station of *Follett, municipal water tank, (black), finial*, is 10°55'46''.

Supplementary points

Eccentric No. 4 (Union County, N.Mex.—Dallam County, Tex., C. M. Durgin, 1922).—On the boundary between Texas and New Mexico, 4 miles south of *Northt west corner of Texas* (see description thereof), at summit of first rise south of thas corner, and on east side of section-line road. Surface and underground mark are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 21.45 meters (70.4 feet) from station in azimuth 96°12'. *Milepost No. 4*, a stone monument, is 178.435 meters (585.42 feet) from station in azimuth 0°04'57''; and *Mile Corner No. 306* is distant 523.205 meters (1,716.55 feet) in azimuth 0°07'44''.

Northwest corner of Texas (Dallam County, Tex.—Union County, N.Mex., C. M. Durgin, 1922).—At the northwest corner of Texas, about 6 miles east and 6 miles north of Clayton. Mark is concrete monument known as "Clarks Monument."

Milepost No. 1 (Dallam County, Tex.—Union County, N.Mex., C. M. Durgin, 1922).—On the Texas-New Mexico boundary, 7 miles east and 6 miles north of Clayton, and 1 mile east of *Northwest corner of Texas* (see description thereof). Mark is a stone monument.

Texhomex (Texas-Oklahoma-New Mexico boundary, C. I. Aslakson, 1931).—A standard disk station mark set in a red sandstone post projecting about 6 inches above ground at point common to the three States, Texas, Oklahoma, and New Mexico. It is 10.6 meters (34.8 feet) south of center line of road, 13.66 meters (44.8 feet) west of corner of fence, and 0.3 meter (1 foot) north of fence line. To reach station from Texline go westward 2 blocks from flagpole and street light; turn right and follow road to northeast and north for 8.5 miles to where road turns east along north boundary of Texas; then east 1.1 miles to station. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 6 inches above ground, is 8.2 meters (26.9 feet) south of center line of road, 0.35 meter (1.1 feet) north of fence line, and 25.53 meters (83.8 feet) from station, in azimuth 89°59'. No. 2 projects about 4 inches above ground, is 15.4 meters (50.5 feet) west of center line of road, 0.23 meter (0.8 foot) east of fence line, and approximately 0.5 mile from station, in azimuth 179°15'34''. Other azimuths from the station are: *Clayton, municipal water tank, finial*, 70°02'02''; *Kidder astronomical station* (see description thereof); distant 200.349 meters (657.31 feet), 108°49'22''.

Kidder astronomical station (Union County, N.Mex., General Land Office, 1903; C. I. Aslakson, 1931).—About 200 yards west by north from the corner common to States of Texas, Oklahoma, and New Mexico. Mark is a truncated cone of concrete molded in a zinc form, and resting on a concrete base. Cone is about 15 inches in diameter and 30 inches high, and on its side is stamped: "36°30' N. Lat., 103° W. Long., 1903." Station *Texhomex* (see description thereof) is 200.349 meters (657.31 feet) distant in azimuth 288°49'18''.

T. 1 N., R. 4 E., sec. 36, southeast corner (Texas-Oklahoma State boundary, C. I. Aslakson, 1931).—On an east-and-west fence line, at west end of a long wire gate and at foot of wire brace on west gate post. Reached from Boise City by going south on Oklahoma route 41 (road to Dalhart, Tex.) to point where road

turns left along State line. Turn right and go 1 mile to station. From Texline, Tex., go east 14 miles on main road from a Magnolia filling station, north 4 miles, east $10\frac{1}{2}$ miles to a T-intersection; thence north $3\frac{1}{2}$ miles to another T-intersection; then west 0.8 mile to where main road turns to right, and continue straight ahead 1 mile to station. Surface mark is standard disk station mark in concrete, note 1 (a). No underground mark. Reference marks are standard reference disks in concrete, note 11 (a). One is 0.38 mile from station, in azimuth $90^{\circ}03'55''$; the other is 29.568 meters (97.01 feet) from station, in azimuth $197^{\circ}20'$. Azimuth from station of *Rabbit Ear Butte, northernmost peak, tip*, $93^{\circ}25'48''$.

Clark monument no. 5 (Texas-Oklahoma State line, C. I. Aslakson, 1931).—about $2\frac{1}{2}$ miles west of Kerrick, in a small pasture, about 25 yards east of a north-and-south fence that separates the pasture from a cultivated field, and about 125 yards south of the State line road. To reach station from Kerrick, go north-west on south side of track 0.5 mile from the Magnolia filling station to the State line road, west on State line road 1.7 miles to gate at northeast corner of pasture; through gate and west one-fourth mile to station. Station marked by a standard disk station mark set in center of old zinc-covered concrete cone which projects about 30 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 83.5 feet west of northeast corner of pasture, 30 feet south of center line of road, 0.80 foot south of east-and-west fence line, and approximately 0.25 mile from station, in azimuth $255^{\circ}45'37''$. No. 2 is 31.6 feet south of center line of road, 2.8 feet southeast of northwest corner of pasture, and 361.62 feet from station, in azimuth $167^{\circ}50'18''$. Both reference marks project 12 inches above ground.

Clark monument no. 7 (Texas-Oklahoma State line, C. I. Aslakson, 1931).—This station is the recovered Clark monument no. 7, described in the notes of A. D. Kidder, General Land Office. The point is on native sod, on the crest of the west bluff of the east crossing of the North Canadian (or Beaver) River. The bluff is high, but the slope is gentle. Station is opposite sec. 36, T. 1 N., R. 10 E., Cimarron meridian, Oklahoma, and about 8 miles west of the town of Texhoma. The original monument described by Kidder was a limestone 32 by 10 by 6 inches, lying on the ground, well embedded in sod. No marks were on the stone, and there was no surface stone in the vicinity. The monument was reconstructed by Kidder, a concrete monument 8 by 14 by 30 inches being set on a concrete base, a 2-foot cube. The base is 2 feet in ground, and the form projects 24 inches above the base. Two reference marks were set in 1931, standard reference disks in concrete, note 11 (a). No. 1 projects about 1 inch above the surface, is 31 feet south of center line of road, 3.8 feet south of fence line, and 365.95 feet from station, in azimuth $179^{\circ}34'$. No. 2 projects about 2 inches above surface, is about 100 yards south of road, 1.1 feet west of north-and-south fence line, and approximately 0.3 mile from station, in azimuth $279^{\circ}43'$. Station is reached from Texhoma by going west on State line road $8\frac{1}{4}$ miles from the southwest corner of railroad station, to point about 0.6 mile west of bridge across the North Canadian (or Beaver) River; the station will then be about 125 yards south of road.

Hitchland south (Hansford County, C. I. Aslakson, 1931).—In Bernstein, on the right-of-way of the Rock Island Railroad, about 70 yards north of the Bernstein station, 51.75 feet west of the west rail, 36.8 feet east of fence line, and 127.9 feet west of the northeast corner of grain elevator. Bernstein is $7\frac{1}{2}$ miles by rail south of Hitchland. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 125.7 feet east of east rail, 67.9 feet southeast of southeast corner of grain elevator, and 211.3 feet from station, in azimuth $316^{\circ}07'$. No. 2 is in fence corner, 75 feet west of west rail, and 0.4 mile from station, in azimuth $18^{\circ}46'48''$.

Hitchland north (Hansford County, C. I. Aslakson, 1931).—On railroad property in the village of Hitchland, Tex., on the extension of the west rail of the Rock Island main track, between spur tracks, west of the section houses, 10.25 meters (33.6 feet) east of east rail of the west spur track, 52.80 meters (173.2 feet) west of west rail of easternmost track, and 28.00 meters (91.9 feet) northwest of northwest corner of concrete scales pit at west end of the Henneman Grain & Seed Co.'s office building. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 3.71 meters (12.2 feet) east of east rail of the Henneman Grain & Seed Co.'s elevator spur track, 29.10 meters (95.5 feet) southwest of the southwest corner of section car shed,

and 41.46 meters (136.0 feet) from station, in azimuth $298^{\circ}11'$. No. 2 is 3.23 meters (10.6 feet) east of east rail of west spur track, 17.43 meters (57.2 feet) north of northwest corner (concrete pier) of the Phillips Petroleum Co.'s main building at bulk plant, and 0.2 mile (speedometer) from station, in azimuth $27^{\circ}04'48''$. Azimuth from station of *Hitchland, railroad water tank, final*, is $233^{\circ}55'23''$.

Hitch (Hansford County, C. I. Aslakson, 1931).—About 5 miles west of Hitchland, 100 yards south of the Texas-Oklahoma State line, and on top of a flat-topped hill on Hitch's ranch. Station reached from Hitchland by going west on road along State line for about $4\frac{1}{2}$ miles to cattle guard; cross cattle guard and continue on road winding down to large ranch house in grove of trees in valley; go through gate at ranch house and continue south on ranch road to gate just south of the most southerly group of trees on creek. Go through gate and on 0.7 mile along pole line to a General Land Office zinc-covered cone in the fence line. Station is on highest point of hill, 100 yards south of this cone. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 111.1 feet from station, in azimuth $304^{\circ}09'$. No. 2 is on top of first hill to westward, 0.3 mile from station, in azimuth $40^{\circ}29'28''$. *Clark monument no. 9* (see description thereof) is 543.057 meters (1,781.68 feet) from station, in azimuth $270^{\circ}25'37''$. Azimuth from station of final of south cupola of large barn at ranch about 1 mile distant is $240^{\circ}41'14''$.

Clark monument no. 9 (Texas-Oklahoma boundary line, C. I. Aslakson, 1931).—About $4\frac{3}{4}$ miles west of Hitchland, in an open pasture, 100 yards south of east-west fence line with pole line along it, and 543.057 meters (1,781.68 feet) from station *Hitch* (see description thereof), in azimuth $270^{\circ}24'37''$. Marked by truncated cone of concrete, 3 feet high, moulded in zinc form.

Hansford County, Tex., northeast corner (Hansford County, C. I. Aslakson, 1931).—A limestone post with cross mark in center, standing about 1 foot above ground. From it *Clark monument no. 10* (see description thereof) is distant 307.990 meters (1,010.46 feet), in azimuth $89^{\circ}59'28''$.

Clark monument no. 10 (Texas-Oklahoma State line, C. I. Aslakson, 1931).—About 0.6 mile east of the southwest corner sec. 35, T. 1 N., R. 18 E., about 160 feet south of an east-and-west fence, in pasture. To reach station from Hardesty, Okla., a village on the Trunk Line Highway, go east 2.3 miles from railroad crossing, then south 1.0 mile, east 3.0 miles, and south 7.0 miles to State line fence. Turn east along north side of fence and go 0.4 mile to gate, through gate, and 0.2 mile east to station in pasture. Station marked by a cone-shaped concrete post about 3 feet high placed by the United States General Land Office to mark the original position of Clark monument no. 10. Center marked by nail head flush with surface, near center of post. Reference marks set in 1931 are standard reference disks in concrete, note 11 (a). No. 1 is in east-and-west fence line, and 55.71 meters (182.8 feet) from station, in azimuth 221° . No. 2 is 1 foot west of north-and-south fence line, on range with west end of saddle west of a cone-shaped butte on southeast horizon, and 0.2 mile (speedometer) from station, in azimuth $330^{\circ}15'04''$. Azimuth from station to *Hansford County, Tex., northeast corner* (see description thereof), distant 307.990 meters (1,010.46 feet), is $269^{\circ}59'20''$; tip of vertical shaft of windmill at house, distant about one-half mile, is $17^{\circ}16'10''$.

Dower (Beaver County, Okla., C. I. Aslakson, 1931).—About 7 miles north of Perryton, Tex., just north of the Texas-Oklahoma State line, in southern part of sec. 33, T. 1 N., R. 21 E., just east of fence marking west boundary of small plat of land belonging to Fred Dower of Perryton, 155.6 feet west of southwest corner of Sinclair filling station at road intersection, 77 feet north of center line of road (U.S. route no. 83), and 54 feet northeast of fence corner. Reached from Perryton by going north on Main Street and route 83, 6.8 miles from railroad crossing. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is south of road, 1 foot north of fence, and 129.1 feet from station, in azimuth $328^{\circ}14'$. No. 2 is south of road, 1 foot north of fence on south of road, and 0.25 mile (speedometer) from station, in azimuth $85^{\circ}22'19''$. Azimuth from station of *Perryton, municipal water tank (silver), final*, is $00^{\circ}32'27''$.

Gaylord (Beaver County, Okla., C. I. Aslakson, 1931).—On or near the State boundary line, at southwest corner of sec. 36, T. 1 N., R. 24 E., about 4 miles north and one-half mile east of Gaylord, about 3 miles north and 6 miles east of

Booker, Tex., $1\frac{1}{2}$ feet east of a north-and-south fence on east side of section line road, and 15.00 meters (49.2 feet) north of a fence corner and an east-and-west fence that is supposed to be on the State line. To reach station from Booker, Tex., go east from Main Street 0.5 mile; turn north across railroad tracks and go 0.5 mile to crossroads, east 5.0 miles, north 2.0 miles to lane leading east. Turn into lane and go east 0.4 mile to gate to farmhouse, north of road; pass through gate, through yard and barn lot to farm road leading north through cultivated field, 0.5 mile from barn to fence and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), placed $1\frac{1}{2}$ feet east of fence, 7.5 meters (24.6 feet) east of center line of road, and 35.30 meters (115.8 feet) from station, in azimuth $179^{\circ}37'$. Other azimuths from station: Letter "I" in word "Service", on Cities Service Oil Co.'s white tank, distant about 4.0 miles, $220^{\circ}44'33''$; Booker, municipal water tank (black), final, $61^{\circ}10'52''$.

Northeast corner of Texas (1928) (Texas-Oklahoma boundary, C. I. Aslakson, 1931).—Established by order of the Supreme Court of the United States in 1928, and not to be confused with station of similar name determined in 1927, which marked the old corner, now superseded. Old station called *Old northeast corner of Texas* in this report. In 1928 station described as being in the SW $\frac{1}{4}$ sec. 4, T. 23 N., R. 26 W., in a cultivated field, about 10 feet east of remains of old fence which was apparently on line between secs. 4 and 5, on property owned by Mrs. Flossie Teats of Manchester, Okla., and rented by Perry Tice, who lives one-fourth mile to southeast. Station also one-half mile north of residence of Alphonso A. Larkey. In 1931 reported that fence above mentioned had been moved to east of station. To reach from Follet go north on Main Street to end of paving, then east 0.5 mile, north 3.0 miles, east 1.0 mile, north 1.4 miles, east 0.5 mile, north 1.0 mile to Trunk Highway, thence along Trunk Highway 5.7 miles to turn to south. Continue south 0.5 mile, to turn to east. Here dim road leads south. Follow dim road south 0.4 mile to road leading east. Turn east and go 0.2 mile to turn to south. Station is about 100 yards south of this turn, on east side of road, in head of small wash. Marked by concrete monument, base 30 inches square set 24 inches in ground and surmounted by a galvanized iron form 18 inches in diameter at top, 24 inches in diameter at bottom, and 42 inches high, filled with concrete and imbedded 9 inches in the base, so that top of monument projects 33 inches above ground. In top of monument is set a bronze tablet inscribed: The Supreme Court of the United States, Northeast Corner of Texas, 1928. The disk is further inscribed with the geodetic position of the point. In 1931 two reference marks were set. They are standard reference disks in concrete, note 11 (a). No. 1 is west of the fence on the east side of the road, approximately 730 yards from station, in azimuth $359^{\circ}40'37''$. No. 2 is 1 foot east of fence on west side of road, 16.23 meters (53.2 feet) from station, in azimuth $109^{\circ}14'$. *Kidder monument (1903)* (see description thereof) is 250 feet from station in azimuth $136^{\circ}22'$.

AMARILLO-DEL RIO ARC

Principal points

Wesley (Randall County, C. I. Aslakson, 1932; 1933).—Two miles north and 5 miles west of Wayside, about one-fourth mile west of the Armstrong-Randall County line, about $1\frac{1}{2}$ miles south of the south rim of Palo Duro Canyon, on land owned and occupied by Mr. J. W. Wesley. To reach station from Wayside go west out of town on section line road for 1.0 mile; turn right (north) and go 1 mile; then left (west) 4.0 miles; right (north) 1.0 mile to lane leading to left (west). Turn into this lane and go about 200 yards to gate across lane and station site. To reach the station from Canyon go south on United States Highway 385, 10.5 miles from main street of Canyon to Ralph's Siding; continue south on the highway (U S 385) 2 miles to a road turning out to left (east) and follow this road due east for a distance of about 14.5 miles to a "Four Corners"—this is not a regular four corners, but the road continuing to the east, jogs to the north about 100 meters (328 feet). Turn left (north) and go 1.0 mile to lane leading to west (left). Turn into this lane and go about 200 meters to gate and station site. The speedometer readings leading to the "Four Corners" were over muddy roads and apt to be in error. Station is on pasture land, 40 feet north of center of lane, and 75 feet east of fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete,

note 11 (a). No. 1 projects 8 inches above the ground, is at fence corner about 400 feet west of ranch house, and is 0.3 mile from station, in azimuth $217^{\circ}20'56''$. No. 2 projects 8 inches above ground, is 2 feet north of fence line, and 84.2 meters (276 feet) from station, in azimuth $275^{\circ}29'$. Other azimuths from station are: Chimney of schoolhouse 1 mile to west, $42^{\circ}38'23''$; Happy, municipal water tank, $67^{\circ}00'25''$.

Neal (Randall County, C. I. Aslakson, 1932).—About $9\frac{1}{2}$ miles south and 4 miles east of Canyon, about $6\frac{1}{2}$ miles north and 0.5 mile west of Happy, about $1\frac{1}{2}$ miles east and 0.5 mile north of Ralph's siding, in sec. 53, block M8, on land owned and occupied by Mr. C. L. Neal. Station is in the northeast corner of the lot, north of the house, 100.8 feet northwest of the northwest corner of the barn, about 14 meters (46 feet) north of two small trees, 3.10 meters (10.2 feet) west of fence, and 2.60 meters (8.5 feet) south of fence. To reach station from Canyon go east on Main Street to its intersection with United States Highway 385 going south; thence south 10.3 miles to road leading east at a filling station about 0.2 mile north of elevator at Ralph's siding; here turn left and go 1.4 miles to corner, then north one-fourth mile to Mr. Neal's house and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in northwest corner of lot, about 10 meters (33 feet) east of center of road, and 59.40 meters (194.9 feet) from station, in azimuth $92^{\circ}10''$. No. 2 is 1 foot east of fence, east of road, and 0.2 mile (by speedometer) from station, in azimuth $169^{\circ}53'54''$. Azimuth from station of Happy, municipal water tank, is $355^{\circ}13'03''$.

Ackley (Swisher County, C. I. Aslakson, 1932).—Thirteen miles east and $4\frac{1}{4}$ miles south of the town of Happy; 5 miles south of the Randall-Swisher County line; on highest point of prominent ridge, on land owned by Mrs. E. H. Ackley, and leased by Mr. Brown. To reach station from Happy railroad station go east 0.3 mile on United States Highway 385 to point where the highway turns to right (south); at this point turn left (north) and go 0.4 mile, then right (east) at stucco house with green roof, and continue east along county line road for 13 miles, then right (south) into graded dirt road, a small brown house being about 200 meters (656 feet) southeast of this turn. Continue south for 3.0 miles, then right (west) 1.0 mile, then left (south) 2.5 miles to a gate on the left (east) side of road at farm road leading in to farmhouses. Go through gate and continue on this road to second house (unpainted, corrugated iron, with group of trees), then through gate and along ridge to station site on highest point northeast of farmhouse. Station is in northwest corner of pasture, 108 feet south of fence line, 155 feet east of fence line, and one-fourth mile north by west of farmhouse. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is 4 inches below surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above the ground, is in southeast corner of pasture, and about 0.3 mile from station, in azimuth $332^{\circ}22'13''$. No. 2 projects 6 inches above ground, is in fence line 100 feet south of fence corner, and is 162.37 feet from station, in azimuth $97^{\circ}11'$. The azimuth from station of Tulia, municipal water tank, is $41^{\circ}24'28''$.

Klein (Swisher County, C. I. Aslakson, 1932).—In the southwestern part of sec. 64, block M8, one-half mile west and $4\frac{1}{4}$ miles south of Happy, $5\frac{1}{2}$ miles west and $9\frac{1}{4}$ miles north of Tulia, on land belonging to Mr. Louis Klein. Station is in the southwest corner of a yard around a small bungalow with chimney in center, 37.8 meters (124 feet) southwest of southwest corner of house, and 12.2 meters (40 feet) northeast of southwest corner post of yard. To reach station from Happy go west on Main Street 0.5 mile to intersection with north-and-south road, then south 4.4 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of the fence on west side of road and 19.12 meters (62.7 feet) from station, in azimuth $86^{\circ}36'$. No. 2 is north of no. 1, 1 foot east of same fence, and 0.2 mile (by speedometer) from station in azimuth $176^{\circ}25'17''$. Azimuth of Happy, municipal water tank, is $187^{\circ}35'21''$.

Shafer (Swisher County, C. I. Aslakson, 1932).—Five and one-half miles east and one-half mile south of Tulia, on land owned and occupied by H. L. Shafer, 81 feet east of center of north-and-south section line road, 53 feet east of fence line, 32.9 feet south of fence line, and 60 feet south by west from a sod block house trimmed in green. Station reached from Tulia by proceeding south from

obelisk mile post in center of main street, 0.5 mile to a T-intersection, there turning east on road with transmission line alongside and going east 5.5 miles to the T-intersection and sod house mentioned above. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 5 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is in fence corner 0.25 mile from station, in azimuth $3^{\circ}30'55''$. No. 2 projects 5 inches above ground, is in fence line, 102.05 feet from station, in azimuth $93^{\circ}02'$. Other azimuths from station are: *Tulia, Swisher County Courthouse cupola, finial*, $95^{\circ}48'40''$; *Tulia, municipal water tank*, $97^{\circ}25'22''$; *Happy, municipal water tank*, $144^{\circ}36'09''$.

Tulia (Swisher County, C. I. Aslakson, 1932).—About 4 miles west and $1\frac{1}{2}$ miles south of Tulia, on land owned by Albert Bivens, in an east-and-west fence which separates sod land on the north from plowed land on the south, 0.1 mile west of a gate in a north-and-south fence, 67.20 meters (220.5 feet) east of a fence corner, and 115 meters (377 feet) north of east of a windmill. To reach station from Tulia go west on Main Street to point where United States Highway 385 turns north; here turn south and go 0.5 mile, then west on main traveled road 3.5 miles to gate on south side of road with farm road leading to yellow house. Follow farm road south past house and through barnyard gate, thence along winding road south to first east-and-west fence and gate at junction with north-and-south fence; pass through gate to station as described. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north-and-south fence line, 0.1 mile (by speedometer) from station, in azimuth $238^{\circ}25'30''$. No. 2 is in north-and-south fence line, 21.9 meters (72 feet) south of corner, 47.7 meters (156 feet) east of windmill, and 69.54 meters (228.2 feet) from station, in azimuth $71^{\circ}50'$. Other azimuths from station are: *Tulia, municipal water tank*, $248^{\circ}52'21''$; *Tulia, Swisher County Courthouse cupola*, $251^{\circ}01'37''$.

Kress (Swisher County, C. I. Aslakson, 1931).—Four miles east and 1 mile north of the village of Kress, on the highest point of a pastured ridge, on land owned by the Texas Land Development Co., and leased by Mr. Alfred Bernar. Station is about 200 meters (656 feet) northwest of house, 94 feet west of fence line, and 113 feet west of center of road. To reach station from Kress, go out of town on road due east from the railroad depot 0.4 mile to T-intersection; turn left (north) and go 0.2 mile; turn right (east) onto road with transmission line alongside and go 2.0 miles; then turn left (north) with main traveled road and go 0.5 mile; then to right (east) for 1.5 miles; here turn left (north) over board culvert and go 0.6 mile to highest point of ridge just north of house on east side of road, and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 1 inch above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 6 inches below surface of ground, about 175 meters (574 feet) north of house, 1 foot east of fence line, 21 feet east of center of road, and 138.15 feet from station in azimuth $252^{\circ}45'$. No. 2 is flush with ground, in southeast corner of field, 0.9 foot west of fence line, 21 feet west of center of road, and 0.3 mile from station in azimuth $355^{\circ}47'09''$. Other azimuths from station are: *Plainview, municipal water tank, finial*, $4^{\circ}50'59''$; *Kress, stack on factory*, $70^{\circ}12'46''$; *Tulia, Swisher County Courthouse cupola, finial*, $155^{\circ}49'12''$; *Tulia, municipal water tank*, $155^{\circ}51'22''$.

Bush (Swisher County, C. I. Aslakson, 1932).—About $11\frac{1}{2}$ miles south and 4 miles west of Tulia, $5\frac{1}{4}$ miles west and one-fourth mile north of Kress, north of road, in southwest corner of small pasture owned by Mr. J. A. Bush, about 0.3 mile west of his house, 2.60 meters (8.5 feet) north of fence on north of road, and 4.50 meters (14.8 feet) east of a north-and-south fence. To reach station from Kress go west on road to Hart from Texaco filling station at north side of town for 3.5 miles, jog north 0.2 mile, thence west 1.7 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is north of fence on north side of road, about 37 yards southwest of southwest corner of Mr. Bush's house, and 0.27 mile (by speedometer) from station, in azimuth $270^{\circ}27'01''$. No. 2 is south of the road, in a fence corner, and 27.30 meters (89.6 feet) from station, in azimuth $39^{\circ}54'$. Other azimuths from station are: *Tulia, south side of concrete elevator, top window*, $198^{\circ}18'16''$; *Kress, white church steeple*, $274^{\circ}46'20''$.

Heath (Hale County, C. I. Aslakson, 1932).—One and one-half miles east and 3 miles north of Plainview, in pasture land owned by Mrs. C. E. Heath and leased by Mr. Freese, 49 feet north of east-and-west fence line, 68 feet north of center of section-line road, 94.3 feet east of a north-and-south fence line, and 130 feet east of a house. Station reached from Plainview by going north $2\frac{3}{4}$ miles on United States Highway 385 from point opposite large elevator and flour mill (Harvest Queen Mill) where highway crosses the railway tracks to road turning out to right (east) across the railroad tracks, then east on this road 1.6 miles to small house on north side of road, and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface marks projects 1 inch above the ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 3 inches above the ground, is 1.2 feet north of fence line, 23 feet west of center of road, and 0.4 mile from station, in azimuth $258^{\circ}42'04''$. No. 2 projects 3 inches above ground, is 1 foot south of fence line, 20.5 feet south of center of road, and 92.87 feet from station, in azimuth $11^{\circ}18'$. Other azimuths from station are: *Plainview, municipal water tank, final*, $19^{\circ}41'13''$; *Hale Center, municipal water tank, final*, $38^{\circ}52'26''$.

Watson (Hale County, C. I. Aslakson, 1932).—About 10 miles west and $2\frac{1}{2}$ miles north of Plainview, 11 miles north and 2 miles west of Hale Center, in the northeast corner of the south half of sec. 19, block JK, on land owned and occupied by J. F. Watson, about 100 yards northeast of his house, at the north end of a parkway west of road, between road and east fence of yard and barnyard lot, 10.2 meters (33 feet) west of center line of road, 8.25 meters (27.1 feet) south of fence corner, and 7.0 meters (23 feet) east of fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line, 7.30 meters (24.0 feet) east of center of road, and 17.58 meters (57.7 feet) from station, in azimuth $265^{\circ}43'$. No. 2 is in fence line, 23 feet east of center of road, 22 feet south of the south end of an iron-pipe culvert in the east ditch, and 0.17 mile (by speedometer) from station, in azimuth $355^{\circ}29'40''$. Other azimuths from station are: *Plainview, municipal water tank, final*, $283^{\circ}40'45''$; *Hale Center, municipal water tank, final*, $348^{\circ}38'42''$.

Rogers (Hale County, C. I. Aslakson, 1932; 1933).—About $6\frac{1}{2}$ miles south and 2 miles east of Plainview, on land owned and occupied by Mrs. Rogers, 114 feet south of a fence line, 61 feet east of a fence line, and 97 feet east of center of road. To reach station from Plainview go south on the street along west side of courthouse square, taking distance from windmill on west side of square, 0.4 mile to point where the main highway (United States Highway 385) turns to right (west); continue straight ahead 0.2 mile, then turn left (east) and go 0.3 mile; then right (due south) 5.0 miles to crossroads at a sign "8 miles to Plainview"; here turn left (east) and go 1.0 mile, then right (south) 0.25 mile to a white house with green roof on east side of road and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 2 inches above ground, is 0.9 foot west of fence line, 24 feet west of center of road, and 118.4 feet from station, in azimuth $84^{\circ}11'$. No. 2 projects 2 inches above the ground, is 15.9 feet south of fence corner, 25 feet west of center of road, 2.2 feet west of fence line, 43 feet southwest of road intersection, and 0.25 mile from station, in azimuth $175^{\circ}12'22''$. Other azimuths from the station are: *Hale Center, municipal water tank, final*, $79^{\circ}56'38''$; *Plainview, cotton mill water tank, final*, $168^{\circ}09'21''$; *Plainview, municipal water tank, final*, $169^{\circ}09'48''$.

Teston (Hale County, C. I. Aslakson, 1932; 1933).—About one-fourth mile west of the southwest corner of section 21, block A2, $7\frac{1}{2}$ miles south and $10\frac{1}{2}$ miles west of Plainview, 1 mile north and 1.7 miles west of Hale Center, on the north side of the road, in the east-and-west fence north of a lane which parallels the road, on land belonging to Mr. A. B. Teston, and 20.4 meters (66.9 feet) north of Dr. and Mrs. Bridges' grave monument in cemetery south of road. To reach station from Hale Center go west from First National Bank 0.5 mile to road leading north; thence north 1.0 mile to east-and-west road; turn west and go 1.2 miles to cemetery and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence corner in southeast corner of intersection of two roads, diagonally across from a small house north-west of an iron-pipe corner post, and 0.21 mile (by speedometer) from station, in azimuth $272^{\circ}50'52''$; no. 2 is 1 foot south of the fence south of the road, in the

cemetery, 34 feet west of the Bridges' monument, and 19.44 meters (63.8 feet) from station, in azimuth $27^{\circ}50'$. Azimuth from station to *Hale Center, municipal water tank, final*, is $299^{\circ}36'51''$. In 1933 the widening of the public road necessitated lowering the marks by the county surveyor. Marks are now 1 foot below surface of graded road. An additional reference mark, a standard tablet in concrete block 16 inches square and 20 inches long, was set flush with ground, 1 foot north of north fence of widened lane, in opposite direction from R. M. no. 2 and 22.75 feet from station in azimuth $207^{\circ}50'$.

Stewart (Hale County, C. I. Aslakson, 1932).—About 18 miles due south of Plainview, about $9\frac{1}{2}$ miles south and 8 miles east of Hale Center, on land owned and occupied by Mr. B. H. Stewart, 33 feet south of fence line, 68 feet east of center of road, and 109.5 feet northwest of northwest corner of farmhouse. To reach from Plainview go south on street along west side of courthouse square 0.4 mile from windmill on west side of square to point where main highway (U.S. Highway 385) turns right (west); continue straight ahead 0.2 mile; turn left (east) and go 0.3 mile; then right (south) and go due south 17.5 miles to an unpainted house on east side of road and station site, reached just after jogging to west around a lake. To reach from the First National Bank at Hale Center, go south 10.0 miles on United States Highway 385, turn left (east) and go 9.0 miles to crossroads. (About 1 mile of this stretch will be through pasture land along section line fence, but is passable at all times.) Turn left (north) at crossroads, and go 0.3 mile to house mentioned above and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 2 inches above the ground, is 2.3 feet east of north-and-south fence line, 24 feet north of east-and-west fence line, 21 feet east of center of road, 30 feet northeast of road intersection, and 0.30 mile from station, in azimuth $121^{\circ}26''$; no. 2 projects 8 inches above ground, is 0.5 foot west of north-and-south fence line, 30 feet west of center of road, and 98.04 feet from station, in azimuth $88^{\circ}16'$. Other azimuths from station are: *West Texas Utilities Co., tank (Tuco)*, $1\frac{1}{2}$ miles north of Abernathy, $66^{\circ}55'37''$; *Hale Center, municipal water tank, final*, $138^{\circ}46'19''$; *Plainview, municipal water tank, final*, $179^{\circ}12'44''$; *Petersburg, railroad water tank, final*, $300^{\circ}20'57''$.

Holmes (Hale County, C. I. Aslakson, 1932).—About $9\frac{1}{2}$ miles south and $1\frac{1}{2}$ miles west of Hale Center, about 6 miles north and $1\frac{1}{2}$ miles west of Abernathy, 0.6 mile north of the southeast corner of section 90, block A4, about 75 feet southeast of the southeast end of a small dirt reservoir in a clump of trees, on land owned and occupied by Isaac Holmes, in a north-and-south fence line west of road, and 3.40 meters (11.2 feet) south of corner. To reach station from Hale Center go south 9.9 miles on United States Highway 385 from the First National Bank to a section line road to west; go west 1.0 mile, then north 0.6 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of fence east of road, and 15.66 meters (51.4 feet) from station, in azimuth $308^{\circ}38'$; no. 2 is in southeast corner of field, about 5 feet west of corner post, and 0.11 mile (by speedometer) from station, in azimuth $00^{\circ}35'10''$. Azimuth from station of *Hale Center, municipal water tank, final*, is $189^{\circ}11'12''$. Station *Foster* (see description thereof), distant about 10 miles, is visible from ground in azimuth $8^{\circ}24'27''$.

Lincecum (Lubbock County, C. I. Aslakson, 1932).—About $8\frac{1}{2}$ miles east and $3\frac{1}{2}$ miles south of Abernathy, on highest point of a grassy ridge owned by M. T. Lincecum. Station is 235 feet west of fence line, and 480 feet south of road. To reach from Abernathy go south 0.5 mile on United States Highway 385 to road turning east over railroad just south of cattle pens; turn onto this road and go 1.4 miles; then south 1.0 mile; east 7.0 miles; south 2 miles to a T-intersection; and east 0.4 mile to an unpainted house on north side of road and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above the ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above ground, and is in fence line, 236.7 feet from station, in azimuth $296^{\circ}57'$; no. 2 is 7 inches above ground, 1.0 foot south of fence line, 12 feet south of center of road, south of farmhouse, 0.15 mile from station, in azimuth $173^{\circ}43'06''$. Other azimuths from station are: *Southeast Lubbock, municipal water tank, final*, $30^{\circ}08'52''$; *Petersburg, railroad water tank final*, $220^{\circ}28'55''$; *Idalou, municipal water tank, final*, $354^{\circ}08'47''$.

Foster (Lubbock County, C. I. Aslakson, 1932).—About 3 miles west and 3 miles south of Abernathy, $2\frac{1}{2}$ miles south of the Hale-Lubbock county line, about 0.7 mile north and 0.4 mile west of the southeast corner of section 10, block D, on land belonging to a Mr. Foster of Lubbock. Station is on west embankment around reservoir, 4.5 meters (15 feet) east of a north-and-south fence to west of reservoir, and 16 meters (52 feet) southeast of windmill and well in southeast corner of a lot containing small farmhouse and shed. Station reached from Abernathy by going south 3.6 miles on United States route 385 from post office to section-line road leading west; thence west 3.0 miles to road leading north, then north 0.7 mile, and west 0.4 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line north of station, approximately 1,000 feet from station, in azimuth $175^{\circ}13'30''$; no. 2 is southwest of farmhouse, south of fence, and 63.93 meters (209.7 feet) from station, in azimuth $79^{\circ}47'$. Azimuth from station of *Lubbock, municipal standpipe*, is $352^{\circ}47'45''$.

Holt (Lubbock County, C. I. Aslakson, 1932).—About 1 mile south and three-fourths mile west of Idalou, in a pasture lot on land belonging to Mr. Harlon Holt of Lamesa. Station is 110 feet north of center of road, 117 feet east of fence line, 165 feet east of house, and 210 feet west of fence line. To reach station from First State Bank in Idalou, go west two blocks, then turn left and go due south 1 mile to T-intersection, then west 0.5 mile to white house on north side of road and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above the ground, is 18 feet east of center of road, in fence corner, opposite white house with green roof, and is 230.0 feet from station, in azimuth $296^{\circ}14'$; no. 2 projects 2 inches above the ground, is 18 feet south of center of road, 1.2 feet north of fence line, and 0.25 mile from station, in azimuth $82^{\circ}33'03''$. Other azimuths from station are: *Southeast Lubbock, municipal water tank, final*, $59^{\circ}28'06''$; *Lubbock, municipal standpipe*, $63^{\circ}09'50''$; *Lubbock, municipal airport beacon*, $92^{\circ}23'51''$; *Idalou, municipal water tank, final*, $211^{\circ}46'10''$; *Lorenzo, municipal water tank, final*, $261^{\circ}22'04''$; *Slaton cotton compress, silver water tank, final*, $349^{\circ}32'50''$.

McCauley (Lubbock County, C. I. Aslakson, 1932).—Three and one-half miles north and 2 miles west of the courthouse in Lubbock, in section 12, about 0.5 mile west and 0.1 mile south of the southeast corner of section 2, block D4, on land owned by John McCauley, 63.85 meters (209.5 feet) southwest of the southwest corner of a yellow bungalow, on high sandy ground at the northwest end of a small dry reservoir in pasture land. It is 22.27 meters (73.0 feet) west of an east-and-west fence, and 17 meters (56 feet) east of an oblique fence running north east and southwest. To reach station from Lubbock go west on Broadway to College Avenue (State Highway No. 7); turn north and go 1.4 miles to point where highway swings to left and follows railroad; leave highway and continue north across railroad 1.9 miles to farm road leading to left; turn west on farm road and go 0.35 mile, then north 0.1 mile and west 0.1 mile to yellow bungalow and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an east-and-west fence line, 0.24 mile (by speedometer) from station, in azimuth $8^{\circ}49'50''$; no. 2 is in the oblique fence line, 21.2 meters (70 feet) from station, in azimuth $144^{\circ}56'$. Other azimuths from station are: *Lubbock, municipal standpipe*, $347^{\circ}20'34''$; *Lubbock, West Texas Institute of Technology, water tank, final*, $357^{\circ}25'56''$.

B.M. J 71 ecc. (Lubbock County, C. I. Aslakson, 1932).—B.M. J 71 established in 1930 was described as being 1.2 miles southeast of Posey, on the Panhandle & Santa Fe Railway, at the northwest end of the largest cut between Lubbock and Slaton, 51 feet southwest of the track, and 25 feet northwest of milepost 686. It was marked by a standard disk stamped "J 71, 1930", set in top of a concrete post. In 1932 it was further described as being $1\frac{1}{2}$ feet outside the railway south right-of-way fence, 65 paces northwest of a jog in the south right-of-way fence, and 49.5 feet west by south of milepost 686, a vertical section of rail set south of track and numbered 686. *B.M. J 71* is 4.943 meters (16.22 feet) from the triangulation station (B.M. J 71 ecc.), in azimuth $24^{\circ}04'$. The triangulation station is 15 feet northeast of the railway right-of-way fence, 65 paces northwest of jog in south right-of-way fence, 36 feet southwest of southwest rail, and 39 feet west by south of milepost 686. To reach station from Posey go southeast on

Highway No. 7 towards Slaton 1 mile from the Posey schoolhouse. To reach station from station *Holt* go west 0.5 mile to section line road turning south, then south on this road 4.0 miles, then east 1.3 miles, south 4.0 miles, east 1 mile, then turn south and follow winding road through canyon for 3.5 miles to T-intersection on south side of canyon. Here turn west and go 0.4 mile, then south 2.0 miles to State Highway No. 7. Turn northwest into highway and go 1.5 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is 1 foot lower in elevation than bench mark, and projects 1 inch above ground. Reference marks are standard reference disks in concrete, note 11(a). No. 1 projects 4 inches above ground, is 135.7 feet south by east of the bench mark, 60 feet southwest of center of pavement, 1 foot east of concrete post marking highway right-of-way station 602+45, and 150.8 feet from station, in azimuth $6^{\circ}22'$; no. 2 projects 2 inches above ground, is 22.5 feet east of fence corner, 32.1 feet southwest of southwest rail, 50.5 feet north of center of road, and 0.2 mile from station, in azimuth $123^{\circ}24'51''$. Other azimuths from the station are: *Posey, black chimney on factory*, $122^{\circ}04'32''$; *Idalou, municipal water tank, final*, $184^{\circ}06'46''$; *Slaton municipal water tank, final* $308^{\circ}42'25''$.

Shepard (Lubbock County, C. I. Aslakson, 1932).—About $7\frac{1}{2}$ miles south and $3\frac{1}{4}$ miles west of the courthouse in Lubbock, 11 miles west of Posey, 0.7 mile west of the northeast corner of section 4, block AK, on land owned by T. L. Shepard of Lubbock. Station is south of the road in the northeast corner of barnyard, 11.8 meters (38.7 feet) south of an east-and-west fence, 2.5 meters (8 feet) west of a north-and-south fence, 17.4 meters (57 feet) south of center line of road. To reach station from Lubbock go west on Broadway to intersection with College Avenue; turn south and go 0.45 mile to concrete highways nos. 137 and 24, which go west along the south side of West Texas Technological College campus; go west 1.0 mile on concrete to section line road to south; thence south 6.9 miles to section line road to west with sign "T. L. Shepard Farm." Go west 0.7 mile to Shepard farm and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of the fence south of road, near the fourth post east of corner, and 0.25 mile (by speedometer) from station, in azimuth $268^{\circ}04'53''$; no. 2 is in fence line north of road, and 24.09 meters (79 feet) from station, in azimuth $173^{\circ}06'$. Other azimuths from station are: *Lubbock, West Texas Institute of Technology, water tank, final* $189^{\circ}31'41''$; *Lubbock, municipal standpipe*, $196^{\circ}41'05''$.

Hillen (Lynn County, C. I. Aslakson, 1932; 1933).—About $1\frac{1}{2}$ miles north and $1\frac{1}{2}$ miles east of Wilson, in pasture owned by Henry Hillen, 0.3 mile east of fence corner and railroad crossing, and 159.5 feet north of fence line. To reach station from Wilson go northeast on road along railroad track, 1.8 miles from point opposite railroad station to road turning out to right (east) across tracks; take this road and go 0.2 mile to fence post on north side of road marked with 3 small blazes; station site is on north side of road, about 50 paces north of blazed fence post, and about 185 paces west of east pasture. To reach station from *B. M. J 71* go northwest on State Highway No. 7 to Posey; turn left (south) onto section line road along east side of school building and continue on for 3.3 miles; jog right (west) 0.1 mile, and go south 2.0 miles; turn left (east) and go 1.3 miles, then south 4.6 miles to road leading west, and then along this road west 0.6 mile to blazed fence post and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 2 inches above the ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above the ground, is 18 feet north of center of road, 1 foot north of fence line, and 257.9 feet from station, in azimuth $340^{\circ}27'$; no. 2 projects 4 inches above ground, is 29.5 feet northeast of fence-line intersection, 48.8 feet east of east rail, 0.9 foot east of north-and-south fence and 0.25 mile from station, in azimuth $84^{\circ}17'12''$. Other azimuths from the station are: *Wilson (Lubbock County), southwest of, church belfry, final*, $53^{\circ}03'24''$; *Wilson (Lubbock County), north of, church belfry, final*, $60^{\circ}00'00''$; *Slaton cotton compress, silver water tank, final*, $202^{\circ}25'59''$; *Slaton municipal water tank, final*, $204^{\circ}02'20''$.

Thomas (Lynn County, C. I. Aslakson, 1932).—About 0.7 mile west and 0.1 mile north of the southeast corner of section 16, block 11, about 18 miles south and $2\frac{1}{2}$ miles west of the courthouse in Lubbock, on land owned by the Thomas brothers of Tahoka, near the northwest corner of the barn lot, northwest of some pig pens and a stack lot, on high ground, 128.5 feet northwest by north of well and windmill, 217 feet northeast of the southeast corner of dingy bungalow tenant

house, and 35 meters (115 feet) west of the northwest corner post of the stack lot. To reach the station from Lubbock go south 17.8 miles on United States Highway 385 from the courthouse to a white stucco filling station (Sinclair) labeled "Wayside" on west side of road; this is about 4.5 miles south of the end of the concrete paving. Here turn west on road to New Home and go 4.75 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line north of road, about 35 yards east of gate to house, and 412.55 feet from station, in azimuth $358^{\circ}04'41''$; no. 2 is in fence corner, at first north-and-south fence west of station, and 0.27 mile (by speedometer) from station, in azimuth $90^{\circ}55'51''$. Other azimuths from station are: *Lubbock, municipal standpipe*, $185^{\circ}00'49''$; *Tahoka, municipal water tank, final*, $333^{\circ}03'21''$.

Bartley (Lynn County, C. I. Aslakson, 1932).—About $2\frac{1}{2}$ miles north and 6 miles east of Tahoka, in east-and-west fence line along north side of land owned and occupied by Mrs. W. R. Bartley, 8 feet east of fence line intersection, and 0.3 mile northeast of farmhouse. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface marks project 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above the ground, is in the north-and-south fence line, 21 feet east of center of road, 45 feet north of east-and-west fence line, and 0.5 mile from station, in azimuth $92^{\circ}16'22''$; no. 2 projects 6 inches above the ground, is in the north-and-south fence line, and 127.0 feet from station, in azimuth $175^{\circ}49'$. Azimuth from station, *Tahoka municipal water tank, final*, $72^{\circ}19'08''$.

Crosby (Lynn County, C. I. Aslakson, 1932).—Six miles west and 1.5 miles north of Tahoka, 0.4 mile north of the southeast corner of section 313, block 3, on land belonging to H. B. Crosby of Wilson. Station is 10.2 meters (33 feet) from a north-and-south fence, on top of a ridge which runs approximately east and west, and is higher toward the west. To reach the station from Tahoka go north 2 blocks from the courthouse, turn west and go 5.3 miles along State Highway No. 84, to a gate to the north leading into a pasture at a point 0.1 mile southwest of two windmills; turn north through gate and follow wagon road to northeast toward windmills, then go northwest for a distance of 1 mile from highway to fork in road; take right-hand fork and go 0.2 mile to fence corner, then north along east side of fence 0.4 mile to station. On the east side of the fence is a trail which runs over to a farm house about 0.4 mile north of the station. Station marked by standard disk station marks in concrete, notes 1 (a), and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot west of the north-and-south fence, and 0.15 mile (by speedometer) from station, in azimuth $181^{\circ}56'33''$; no. 2 is in the fence line, and is 29.79 meters (97.7 feet) from station, in azimuth $337^{\circ}19'$. Other azimuths from the station are: *Tahoka, municipal water tank, final*, $280^{\circ}43'06''$; *O'Donnell municipal water tank, final*, $346^{\circ}12'56''$.

Pennington (Lynn County, C. I. Aslakson, 1932).—About 6.5 miles south and 5.5 miles east of Tahoka, about 7 miles north and 7.5 miles east of O'Donnell, on land owned by Mrs. Pennington and Miss Lewis and rented by Mr. Reed, in fence line north of house, 0.6 mile west of road, at a point where the north-and-south fence enters the east-and-west fence on the north side of the pasture. This is the second and most westerly fence entering from the north, and the fence at this point bends slightly to the north, 10.7 feet south of the fence junction. To reach from Tahoka go east on State Highway 84, 6 miles to filling station in southeast road corner, there turn south 6.6 miles to house on west side of road and entrance to station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line, 528 feet from station in azimuth $341^{\circ}41'56''$; no. 2 projects 4 inches above ground, and is in fence line, 79.70 feet from station, in azimuth $95^{\circ}36'$. Other azimuths from station are: *O'Donnell, municipal water tank, final*, $48^{\circ}26'52''$; *Tahoka, municipal water tank, final*, $140^{\circ}11'00''$.

Pearce (Lynn County, C. I. Aslakson, 1932).—Three and one-half miles west and 8.5 miles south of Tahoka, 1.5 miles west and 4.5 miles north of O'Donnell, 1.1 miles south of the T-Bar school and store, on the west side of a north-and-south road in the northwest corner of a pasture, in northeast corner of field, 6.5 meters (21 feet) west of fence on west side of road, and 5.9 meters (19 feet) south of an east-and-west fence, and 0.15 mile south of the northeast corner of section

25, block 8, on land owned by P. R. Pearce of Fort Worth. To reach station from Tahoka go south on U.S. Highway 385 for 7.5 miles to a section line road to west, then 2 miles west, 1 mile south, 1 mile west, and then 1.15 miles to station on west side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in northeast corner of field, southeast corner of road intersection, 5 feet south of cedar corner post, and 0.12 mile (by speedometer) from station, in azimuth $179^{\circ}49'14''$; no. 2 is in fence line east of road, 6 meters (20 feet) east of center line of road, and 19.76 meters (64.8 feet) from station, in azimuth $265^{\circ}02'$. Other azimuths from station are: T-Bar schoolhouse, 1 mile north, tip of white flagstaff, $181^{\circ}43'00''$; *Tahoka, municipal water tank, final*, $201^{\circ}21'56''$.

Huff (Borden County, C. I. Aslakson, 1932).—About 9 miles east and 3 miles south of O'Donnell, on land owned by Mr. W. J. Huff of Trenton, and leased by Mr. D. W. Kinkaid. Station is 1 foot east of fence line, 53 feet south of fence line, 77 feet south of center of road, 105 feet north of fence line, and 150 feet northwest of farmhouse. To reach station from O'Donnell go east out of town on road along north side of the Ford garage, continuing east 0.5 mile to a T-intersection; jog south and continue east 6 miles; turn south and go 1 mile; then west 0.25 mile; south 0.5 mile, around a curve and south-southeast 2 miles to intersection; then east-northeast 2.25 miles to white house on south side of road and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above the ground, is in fence corner, 18 feet southeast of road intersection, and 0.25 mile from station, in azimuth $77^{\circ}00'10''$; no. 2 projects 4 inches above ground, is 21 feet north of center of road, in fence line, and 98.02 feet from station in azimuth $154^{\circ}28'$. Azimuth of *O'Donnell, municipal water tank, final*, is $111^{\circ}04'55''$.

Akins (Dawson County, C. I. Aslakson, 1932).—About $2\frac{1}{2}$ miles west and $4\frac{1}{2}$ miles south of O'Donnell, about one-fourth mile west of the Panhandle & Santa Fe Railroad, in the northeast corner of section 3, block 34, on high land in pasture lot owned and occupied by I. W. Akins. There are three unpainted houses in the vicinity of the station, which is located near the center of the triangle formed by them, and is 64.25 meters (210.8 feet) northwest of a well and windmill. To reach station from O'Donnell go west and south on United States route 385 from point where highway turns from south to west 4.6 miles to a railroad crossing to west; turn west across railroad, go about one-fourth mile to second board gate on south, then south through gate and toward well and windmill near station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line south of road, 24 yards east of fence corner, 30 yards east of T-intersection of farm road to north, 190 yards west of railroad crossing, and approximately 280 yards from station, in azimuth $223^{\circ}00'01''$; no. 2 is in fence line, 19.3 meters (63 feet) west of windmill and well, and 55.80 meters (183.1 feet) from station, in azimuth $333^{\circ}12'$. Other azimuths from station are: *O'Donnell, municipal water tank, final*, $210^{\circ}09'06''$; *Lamesa, municipal water tank, final*, $20^{\circ}29'02''$.

Southard (Dawson County, C. I. Aslakson, 1932; 1934).—About 14 miles east and 1 mile north of Lamesa, about one-half mile west of the breaks of the Colorado River, on land owned and occupied by J. W. Southard, 391 feet north-northeast of northeast corner of a house, about 1,310 feet west of point (highway chaining station 602+27.5) where State Highway No. 83 curves to south away from old location, 56.0 feet south of center line at highway chaining station 589+18.0, 6.0 feet south of right-of-way fence, and about 25 paces west of gatepost in east-and-west fence. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is between old and new locations of highway, 27.5 feet north of north right-of-way fence at approximate highway chaining station 608+12, and about 0.35 mile from station in azimuth $254^{\circ}22'$. No. 2 is in north right-of-way fence, just west of concrete right-of-way marker (highway chaining station 589+00), and 109.4 feet from station in azimuth $150^{\circ}48'$. Reference mark no. 2 was reset in the above position by the Texas State Highway Department in November 1934; its former location was 93.8 feet from station in azimuth $150^{\circ}48'$. Other azimuths from station are: *O'Donnell, municipal water tank, final*, $160^{\circ}58'40''$; windmill at Mr. Southard's, vertical shaft, tip, $297^{\circ}10'55''$.

Lamesa (Dawson County, C. I. Aslakson, 1932).—Five miles east and 1 mile north of the courthouse at Lamesa, 1.5 miles east and 2.75 miles south of the Arvanna Gin, in the central part of section 3, these directions being based on the assumption that the section lines run north-and-south and east-and-west, an assumption not exactly true. Station is on land owned by Jane King, of Fort Worth, and leased and occupied by E. L. Tyra; it is 13.2 meters (43 feet) west of a north-and-south fence line, 22.6 meters (74 feet) south of an east-and-west fence line, and in a sandy barnyard about 100 meters (328 feet) northeast of a farmhouse on a slight rise in the ground. To reach station from Lamesa go to the northeast corner of Lamesa on United States Highway 385, then east 4.5 miles on section line road, turn north through wooden gate and go 0.3 mile north to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in the southwest corner of a small plot of cultivated ground, 2 feet north of the right-of-way fence on north side of an east-and-west section line road, and 0.3 mile from station, in azimuth $355^{\circ}21'49''$; no. 2 is in a fence corner, 40.98 meters (134.4 feet) from station, in azimuth $107^{\circ}31'$. Other azimuths from station are: *Lamesa, municipal water tank, final*, $66^{\circ}23'14''$; *Lamesa, West Texas Dairy Products Co., concrete stack*, $70^{\circ}14'50''$.

Wasson (Dawson County, C. I. Aslakson, 1932).—About 5 miles south and 14 miles east of Lamesa, on highest point of sand knoll on land of A. L. Wasson, of Big Springs, 127 feet south of high fence post, and 1 foot west of north-and-south fence line. To reach station from Lamesa follow Highway No. 83, 4.5 miles from point in south part of town where highway turns east; then go south 2 miles, east 4 miles, south 5 miles, jog east and continue south 2 miles, then east 2 miles to farmhouse on east side of road. Pass through double gates of farmyard and go south along fence line 0.3 mile to highest point of ridge and station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line approximately 0.2 mile from station, in azimuth $248^{\circ}03'22''$; no. 2 projects 2 inches above ground, is 1 foot west of the north-and-south fence line, and 81.07 feet from station, in azimuth $343^{\circ}54'$. Other azimuths from station are: *Lamesa municipal water tank, final*, $118^{\circ}54'04''$; *Muchakooago (Mushaway) Peak, south side, white outcrop*, $251^{\circ}57'06''$.

King (Dawson County, C. I. Aslakson, 1932).—In the central part of section 47 block 35, T. 5 N., 3.75 miles east and 7.25 miles south of Lamesa, 4.25 miles north and 0.25 mile east of Sparenburg, on land owned and occupied by a Mrs. King, 100 meters (328 feet) west of her farmhouse, 0.3 mile north of section line, and in a north-and-south fence line. To reach station from Lamesa go south on United States Highway 385 for distance of 10.0 miles from the Dawson County courthouse, turn east on section line road at Gulf gasoline station, and go 1.45 miles to wooden gate to north into Mrs. King's place; go through gate and pass along west side of fence to another gate; pass through this gate, and go west to fence corner, then north about 200 meters (656 feet) to station. The station is about 200 meters (656 feet) southwest of a power line, and at highest point of fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in same fence line as the station, and 22.2 meters (73 feet) from it, in azimuth 166° ; no. 2 is in southwest corner of a cultivated field, 1 foot north of a right-of-way fence on north side of section line road, and 0.5 mile (by speedometer) from station, in azimuth $33^{\circ}16'36''$. Other azimuths from the station are: *Lamesa, municipal water tank, final*, $136^{\circ}09'14''$; *Lamesa, West Texas Dairy Products Co., concrete stack*, $138^{\circ}09'12''$.

Davenport (Borden County, C. I. Aslakson, 1932).—About 2 miles east and 1 mile north of Ackerly, on land belonging to A. F. Davenport, who lives at Ackerly. Station is 0.2 mile west of road, in the southwest corner of pasture, 25 feet east of north-and-south fence, 35 feet north of an east-and-west fence, and 42 feet northeast of the fence intersection. To reach from the Colman Hotel in Ackerly, go south 0.3 mile on United States route 385, then east 2 miles, and north 0.5 mile to station site at point where road is partly closed by cross fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard disks in concrete, note 11 (a). No. 1 projects 2 inches above the ground, is 1.5 feet east of the north-and-south fence line, 8 feet east of center of lane, and 0.2 mile from station, in azimuth $255^{\circ}31'46''$; no. 2 projects 6 inches above ground, is in the

north-and-south fence line, and 74.7 feet from station, in azimuth $144^{\circ}36'$. Other azimuths from station are: *Ackerly, small black tank, final*, $69^{\circ}49'50''$; *Lamesa municipal water tank, final*, $129^{\circ}07'04''$; *Muchakooago (Mushaway) Peak, south side, white outcrop*, $231^{\circ}58'36''$.

Mosley (Dawson County, C. I. Aslakson, 1932).—In the SE $\frac{1}{4}$ sec. 33, block 35, T. 4 N., on land belonging to Mr. B. Mosley, of Sweetwater, in the fence line north of section line road, 0.2 mile west of intersection with north-and-south road, with a yellow house in the southeast corner of the intersection. To reach station from Sparenburg, a village on United States Highway 385, about 15 miles south and east of Lamesa, go west on highway 385, 1 mile to point where highway turns north; turn south here and go 1.8 miles to section line road and yellow house mentioned above, then go west 0.2 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot west of fence on west side of north-and-south road, 20 yards south of corner post, opposite the northwest corner of the yellow house, and 0.2 mile (by speedometer) from station, in azimuth $260^{\circ}15'49''$. No. 2 is 1 foot south of fence south of road, and 19.69 meters (64.6 feet) from station, in azimuth $49^{\circ}41'$. Other azimuths from station are: *Brick schoolhouse, white stone slab over door*, distant about 2 miles $182^{\circ}07'32''$; *Ackerly, small black tank, final*, $282^{\circ}11'54''$.

Abrams (Howard County, C. I. Aslakson, 1932).—About 7 miles north and 1 mile west of Big Spring, on pasture land owned by a Mr. Abrams, and leased by Mr. L. S. Hamlin. To reach station from Big Spring go 15.8 miles from the bridge over the railroad, north over United States Highway 385 to where it turns left; continue on north 2.3 miles to station on highest point of knoll on ridge on south side of creek, 30.5 feet northwest of blazed mesquite tree, and 250 paces east of fence line and road. It is about one-fourth mile south of the second culvert. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 2 inches above the ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 6 inches above the ground, is 30 feet east of center line of road, 1.8 feet east of north-and-south fence line, and about 850 feet from station, in azimuth $36^{\circ}08'39''$. No. 2 projects 12 inches above ground, and is 77.40 feet from station, in azimuth $144^{\circ}31'$. Azimuth from station of a 30-foot wooden tank, East Knott, is $48^{\circ}00'50''$.

Zihlman (Martin County, C. I. Aslakson, 1932).—Eleven miles south and 1 mile west of Sparenburg, 7 miles west and 4 miles north of West Knott, two small places on United States Highway 385, station is in the northeast corner of section 66, block A, on land belonging to A. J. Zihlman, of Fort Worth, 3 meters (10 feet) east of fence line on east side of road, about 0.1 mile southwest of section corner and 90 meters (295 feet) southeast of small shack on west side of road. To reach station from Sparenburg go south 10 miles to section line which crosses road, then west 1 mile, and then south 1.1 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line on east side of road, 200 meters (656 feet) north of a farmhouse in southeast corner of field, and 0.7 mile (by speedometer) from station, in azimuth $344^{\circ}58'01''$. No. 2 is in fence line on opposite side of road from station, from which it is distant 16.87 meters (55.3 feet), in azimuth $72^{\circ}57'$. Azimuth from station of *brick schoolhouse, white stone slab over door*, distant about 11 miles, is $167^{\circ}00'36''$.

Woolsey (Glasscock County, C. I. Aslakson, 1932).—Ten miles south and 0.5 mile west of the courthouse in Stanton, in the west central part of section 26, block 36, T. 2 S., on land owned and occupied by Will Woolsey, in fence line 9 meters (30 feet) east of center line of road from Stanton to Garden City, southwest of Mr. Woolsey's house, 52.2 meters (171 feet) southwest of the center of concrete cap of well, and approximately in range with the southwest corner of a large concrete tank which is 11.1 meters (36 feet) northeast of well. To reach station from Stanton, go west on United States Highway 80 to city limits; turn south across railroad opposite filling stations, and go south 9.5 miles to station on east side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 28 feet west of road, opposite the first post south of iron gate on east side of road where telephone line comes in from the west and turns south, and 0.2 mile (speedometer) from station, in azimuth $347^{\circ}47'36''$. No. 2 is 9.2 meters (30 feet) west of center line of road, and 18.21 meters (59.7 feet) from station, in azimuth $80^{\circ}49'$. Other azimuths from station are: *Stanton,*

municipal water tank, finial, 169°01'36''; Stanton, Martin County Courthouse, tip of dome, 169°06'04''.

Curry (Glasscock County, C. I. Aslakson, 1932).—Nineteen and one-fourth miles south and 7 miles west of Big Spring courthouse, about 6 miles north of Garden City, 0.3 mile east of the northwest corner of section 24, block 34, T. 4 S., 12 feet south of an east-and-west fence line, 34.5 feet north of a telephone pole, 106 feet east of a gate in an east-and-west fence line, and 44 feet north of center of road, on high grass land belonging to William and Stephen Curry, of Garden City. To reach station from Big Spring go south on highway 385 for 9.8 miles from Third and Scurry Streets, to a well-traveled road to the west; turn west and go 2 miles; south and follow main road toward Garden City for 13.5 miles to gate to west on top of ridge alongside pipe and telephone lines. Turn west and follow pipe-line road 0.9 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above the ground, is 36 feet south-east of telephone pole, 10 feet south of center of road, and 68.7 feet from station, in azimuth 334°13'. No. 2 projects 4 inches above the ground, is 1 foot west of the east-and-west fence line, and 0.1 mile (speedometer) from station, in azimuth 75°45'20''. The azimuth from station of *Stanton municipal water tank, finial*, is 127°26'02''.

Medlin (Glasscock County, C. I. Aslakson, 1932).—Twenty-three and one-half miles south and 2.5 miles west of Stanton, 15.5 miles west and 1 mile south of Garden City, 0.15 mile south of the northwest corner of sec. 16, block 36, T. 4 S., and 4 meters (13 feet) west of a woven-wire fence, on land owned by L. J. Medlin of Garden City. To reach station from Garden City go west 1.3 miles from schoolhouse; then south 1 mile, and west 4 miles to end of graded road. Turn south through a green board gate; take right fork and go in a westerly direction 3.1 miles to a road fork at a woven-wire gate; take left fork and go 0.25 mile; take right fork and go 0.1 mile to board gate about 300 yards north of ranch house; go through gate and follow road in a westerly direction 5.9 miles to Medlin's house; turn right and go 0.2 mile northeast to a yellow board gate which is next to a woven-wire gate; pass through these gates to the west and go 1 mile to another woven-wire gate; go through this gate and along west side of fence south 0.1 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in pasture, 52.38 meters (171.9 feet) from station in azimuth 54°45'. No. 2 is 1 foot west and 4 feet south of a fence corner, 38 yards east of a woven-wire gate, 44 yards northeast of a 2-inch iron pipe, in ground (probably a section corner), and 0.1 mile (speedometer) from station in azimuth 165°21'35''. The 2-inch iron pipe just mentioned is 21 yards south of the south end of the gate, and 0.1 mile from station in azimuth 152°53'46''. Other azimuths from station are: Tip of wooden windmill at A. J. Medlin's house, 1 mile distant, 258°35'56''; *Midland municipal water tank, finial*, 125°23'31''.

Garden (Glasscock County, C. I. Aslakson, 1932).—About 3½ miles south and 2½ miles west of Garden City, on highest point of ridge one-half mile southeast of the Shell Oil Co.'s pumping station, 478 feet east by south of the northeast property monument of the Texas Power & Light Co.'s transformer yard, 234 feet east by south of the first set of poles east of the yard of the transmission line, and 139.0 feet southwest of three poles at angle in transmission line. To reach station from Garden City go west out of town on section line road along south side of large brick school building, continuing west 1.3 miles from school; turn south and go 1.0 mile; west 1.0 mile to cattle guard; cross guard, turn left onto angling road and go southwest to Shell Co.'s pump station; then follow east fence line of pump station to transmission line transformer yard; turn east and continue along crest of ridge 478 feet to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above ground, is 24.7 feet south of the southernmost pole of transmission line, and is 138.89 feet from station, in azimuth 242°41'. No. 2 projects 5 inches above ground, is 7 feet northwest of the nearest transmission line pole, and 0.2 mile from station in azimuth 117°29'36''. Other azimuths from station are: Northeast corner of

For notes in regard to marking of stations see p. 154.

transmission yard, property monument, $89^{\circ}00'12''$; *Shell pumping station, black water tank, final*, approximately 0.5 mile distant, $136^{\circ}14'38''$; *Shell pumping station, storage tank, final*, distant about 0.5 mile, $137^{\circ}09'26''$; Gardens City, Methodist Church, steeple, $213^{\circ}56'14''$.

Bigby (Glasscock County, C. I. Aslakson, 1932).—Sixteen and one-half miles west and 10 miles south of Garden City, about 4 miles east and 0.75 mile north of the southwest corner of Glasscock County, at southwest corner of Sec. 17, block 36, T. 5 S., on flat prairie country, about 1 mile north of a deserted house and windmill known as the "Routh place", on what is locally known as the "Bigby lease", and 16 meters (52 feet) north of an east-and-west fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an east-and-west fence line, 0.2 mile (speedometer) from station in azimuth $258^{\circ}03'06''$. No. 2 is in the open field, 25.34 meters (83.1 feet) from station, in azimuth $153^{\circ}30'$. Other azimuths from the station are: Tip of well casing at windmill by lone tree, 1 mile distant $243^{\circ}07'18''$; bottom of well casing, windmill 1 mile distant $358^{\circ}11'35''$. To reach station from Garden City go west three blocks from the courthouse, then south about 0.25 mile, west 0.25 mile, to a section line road to south (the main road to Big Lake and points south). Follow this main road south 14.4 miles to a gate leading into a deserted house to north at a point 0.1 mile east of where the main road turns from west to south; turn north through this gate, take left fork for 1.2 miles to another gate, go through this gate and continue 1.0 mile to fork at windmill; take left fork and go 0.4 mile to board gate; go through gate 0.2 mile to ranch house, around south side of ranch house, and turn right through board gate to north at west end of old shed. Take right-hand road to westward and go 1.8 miles to gate. Pass through a gate to the north and then one to the west; take right fork to westward and go 1.1 miles to board gate; pass through gate and go 1.2 miles to ranch house to south; go along north side of house and follow dim tracks westward 1.0 mile to a board gate that is about 75 yards north of red board gate. Pass through gate and continue in a westerly direction, crossing power line at 0.6 mile, a pipe line at 1.0 mile, and arriving at a road fork 1.1 miles beyond pipe line. Take left fork 0.1 mile to red board gate at old house; pass through gate and along south side of house and proceed to west about 0.1 mile to a well-defined road leading southwest; turn left on this road and go 1.2 miles to wire gate and a board gate; pass through wire gate and go 1 mile to gate at windmill and lone tree. Pass through gate and go 0.5 mile to where main road goes through a red board gate. Turn right and go west on north side of fence 1.0 mile to station.

Shields (Glasscock County, C. I. Aslakson, 1932).—About 13.5 miles south and 1.0 mile west of Garden City, on the west side of the Garden City-Stiles road, on land owned by the Shields heirs and leased by C. M. Sparkman, 28 feet west of the north-and-south fence line, and 52 feet west of the center of the road. To reach station from Garden City, go west from the street intersection at the northwest corner of the courthouse 2 blocks; south on main traveled road 3 blocks; west a short distance to where road turns south; from this point go south 4.5 miles; west 1 mile; south 5.0 miles; west 2.0 miles; south 1.0 mile; west 1.0 mile; and then south 1.0 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is 32 feet east of center of road, 1 foot west of fence line, and 91.95 feet from station, in azimuth $228^{\circ}41'$. No. 2 projects 8 inches above ground, is on the fence line, 32 feet east of center of road, and 0.2 mile from station, in azimuth $340^{\circ}06'37''$. Azimuth from station of section corner, northeast four, block A, $344^{\circ}38'20''$.

Kanz (Reagan County, C. I. Aslakson, 1932).—About 7 miles west and 11 miles north of Stiles, 3 miles east and 8 miles south of the northwest corner of Reagan County, about 0.25 mile east of a small ranch house which has a small, round-topped building immediately south of it, in the northeast corner of sec. 22, block C, in the corner of a mesquite pasture owned by Mrs. F. Kanz, 10 feet west of a north-and-south fence, and 11 feet south of the fence running southwest to the ranch house. Land was occupied for a while by Noell James. On the east side of the fence is a gate on the trail which runs north and south along the fence. To reach the station from courthouse in Garden City go west 3 blocks, south 0.25 mile, west 0.25 mile, south 4.5 miles, west 1 mile, south 5 miles, west 2 miles, south 1 mile, west 1 mile, south 4 miles, west 3 miles, south 3 miles, west

1 mile, south 6 miles, and west 3 miles to where the main road turns south. Here go west through S. E. Stout's gate and along south side of section line fence, passing a farm house at 1.0 mile, and reaching a gate 2.1 miles from road; go through gate and south 0.75 mile to fork; take right fork 0.4 mile to windmill, then go westward on dim trail 0.55 mile to where trail runs into plainer road; bear to right on plain road, and go in northwest direction 1.0 mile to gate at section corner; go through gate and follow right fork away from fence 1.2 miles to gate; go through gate 0.4 mile to fork; take right fork and go 2.0 miles to gate to north at an offset section corner; go through gate and follow road 1.6 miles to gate; go through gate and take left fork 0.7 mile to another fork; take left fork and go 0.75 mile to another gate; pass through this gate and go north along west side of fence to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north-and-south fence line, 0.27 mile (speedometer) from station, in azimuth $344^{\circ}40'10''$. No. 2 is 1 foot south of fence running from station to ranch house, and 34.10 meters (111.9 feet) from station, in azimuth $59^{\circ}30'$. Other azimuths from station are: Tip of windmill 1 mile distant $258^{\circ}54'50''$; tip of William Odem's windmill, 3 miles distant, $353^{\circ}48'53''$.

Ricker (Reagan County, C. I. Aslakson, 1932; 1933).—Eight miles north and 2 miles east of Stiles, one-fourth mile east of Garden City-Stiles highway, on the Ricker ranch, 330 feet south of an east-and-west fence line, and due south of a blazed fence post. To reach station from Garden City, go south on the Stiles road 28.5 miles to a point where there are 2 board gates, 1 on either side of road; go through gate on east side of road and eastward for 0.25 mile on ranch road; turn abruptly north and go 0.1 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 696 feet from station, in azimuth $224^{\circ}50'07''$; no. 2, 85.30 feet, $114^{\circ}25'$. Azimuth from station of Ricker ranch windmill, is $261^{\circ}49'14''$.

Fence (U.S.G.S.) (Reagan County, C. I. Aslakson, 1932).—Eleven miles west and 1.5 miles north of Stiles, in sec. 16, block H, 1.5 miles east of the county line, 1 meter (3 feet) west of the east boundary of the section, on high ground, the owner of which is unknown. To reach station from Stiles go west and north 0.5 mile to a cattle guard to west off main road; turn west over guard and go about 100 yards to fork; take left fork for 0.3 mile to another fork; take right fork for 1.8 miles to a gate; go through gate and take right fork for 0.25 mile to fork; take left fork for 0.7 mile and there take left fork again; at 0.15 mile is a cross road; keep straight ahead for 1.0 mile to gate; go through gate 0.5 mile to fork; take right fork 0.5 mile; then right fork for 1.3 miles to side road to south; keep straight ahead here and go 0.1 mile to gate, through gate and along south side of white house 0.2 mile to fork; take left fork and go 0.8 mile to another gate; go through gate, taking right-hand fork just beyond it and go 1.25 miles to several forks at fence corner; here take right fork along north side of fence toward windmill, and go 0.4 mile to gate to north on east side of corral and windmill. Go through gate and follow road 0.75 mile to fork; take left fork and go 1.25 miles to gate through north-and-south fence, turning south on east side of fence and going 0.8 mile to gate at section corner. Go through gate and continue south along fence 0.7 mile to station on west side of fence. The rock in which the U.S.G.S. mark was cemented was small and loose, and the station was therefore remarked, the new surface and underground marks being standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in a mesquite pasture, 15.65 meters (51.3 feet) from station, in azimuth $257^{\circ}33'$. No. 2 is 1 foot west of section boundary fence, 20 feet north of a 2-inch iron pipe in fence line (probably a section corner), and 0.3 mile from station in azimuth $344^{\circ}33'03''$. Other azimuths from station are: *Best municipal water tank*, $328^{\circ}28'00''$; *Texon municipal water tank*, $339^{\circ}35'06''$; 2-inch iron pipe, 0.3 mile distant, $344^{\circ}31'13''$.

Hughes (Reagan County, C. I. Aslakson, 1932).—Three and one-half miles east and 1.0 mile south of Stiles, on high point of ridge on ranch owned by Duane Hughes of San Angelo and leased by Mr. Elrod, 197 feet west of the center of the road, 187 feet west of pipe line, and 506 feet south of an east-and-west fence line. To reach station from Stiles schoolhouse go 6.1 miles on main road toward Big Lake to a point where road turns sharply to the right and to a large red wooden gate; go through gate, turn left and follow fence line back to the west to telephone

and pipe lines; turn right along telephone line and go 1.8 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 8 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 8 inches above the ground, is 1 foot south of the east-and-west fence line, 250 feet west of gate, and 506 feet from station in azimuth $183^{\circ}58'58''$; no. 2 projects 7 inches above the ground, is 47.5 feet north of the nearest telephone pole, 15 feet east of pipe line, 7 feet east of center of road, 600 feet south of gate in fence, and 202.10 feet from station, in azimuth $279^{\circ}53'$. Other azimuths from station are: *Oil derrick*, 4 miles distant, $25^{\circ}54'59''$; red windmill, one-fourth mile distant, $257^{\circ}08'26''$.

Low (U.S.G.S.) (Reagan County, C. I. Aslakson, 1932).—One and one-half miles south and 0.5 mile east of Texon, 1.5 miles south and 3 miles west of Best, in the northeast corner of sec. 25, block 1, on land owned by the University of Texas. Station is on the south side of a golf course, 107 feet southwest of the center of the sixth green, and 120 feet north of an east-and-west fence line which forms the southern boundary of the golf course. To reach the station from Texon go south on Greasewood Street opposite the Atchison, Topeka & Santa Fe Railway station 1.6 miles to a fork; take left fork which goes up a steep hill to a golf course; follow road around left side of course by club house to station at sixth green. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line, 0.1 mile (speedometer) from station, in azimuth $284^{\circ}36'25''$. No. 2 is in same fence line as no. 1, and is 39.20 meters (128.6 feet) from station, in azimuth $18^{\circ}50'$. Other azimuths from station are: *Texon municipal water tank*, $213^{\circ}08'03''$; *Best municipal water tank*, $250^{\circ}50'04''$.

Japson (U.S.G.S.) (Reagan County, C. I. Aslakson, 1932).—About 6 miles north and 3 miles west of Big Lake, about 3 miles northwest of Roy Japson's ranch, on the western one of two low hills, the only prominent ones in the vicinity, 600 feet northwest of a large ground water tank and windmill. To reach station from Big Lake go north on the road to Stiles and Garden City, 7.0 miles from point opposite Texas highway department building in northwest part of town to a red iron ground tank and windmill on left side of road; continue on same road 0.5 mile to wooden mail box on left side of road and ranch road leading out to left; turn onto this road, pass through gate and go 2.0 miles to gate; pass through gate and turn onto road leading northwest to tank and windmill and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 10 inches above the ground, and is 72.11 feet from station in azimuth $243^{\circ}53'$; no. 2 projects 4 inches above the ground, is 51 feet northeast of the tank, and 591 feet from station, in azimuth $322^{\circ}38'10''$. Other azimuths from station are: *Big Lake municipal water tank, final*, $323^{\circ}43'14''$; *oil derrick*, approximately 4 miles distant, $196^{\circ}10'24''$; windmill, 625 feet distant, $331^{\circ}21'50''$.

Shell (Reagan County, C. I. Aslakson, 1932).—Five and one-half miles south and 2 miles east of Texon, 5.5 miles south and 2 miles west of Best, 1 mile north of Grierson Spring, in the northeast corner of sec. 2, on land patented by the Georgetown Railroad Co. and 3.2 meters (10 feet) north of an east-and-west fence line which forms the southern boundary of the Shell petroleum pumping station. To reach the station from Best, go south on graded road just east of the most easterly building in Best for a distance of 7.8 miles from the right turn off main street in Best to the Shell petroleum pumping station; go west through the buildings at the pumping station to the triangulation station in the southwest corner of the grounds. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an east-and-west fence line, 225 yards (paced) from station in azimuth $178^{\circ}44'43''$; no. 2 is in a north-and-south fence line, 3 meters (10 feet) north of a fence corner formed by the boundary fence next to the station, and 47.09 meters (154.5 feet) from station in azimuth $90^{\circ}43'$. Other azimuths from station are: *Shell pumping station, black water tank*, $224^{\circ}03'45''$; wooden windmill, tip of, about 2 miles distant, $244^{\circ}35'19''$.

Cox (U.S.G.S.) (Reagan County, C. I. Aslakson, 1932).—About 7 miles southeast of Big Lake, about 3 miles south of the Kansas City, Mexico & Orient Railway track at point where it crosses the divide east of Big Lake, on a grassy rise near a fence corner, about 1,000 feet west of a north-and-south fence, and 335 feet south of an east-and-west fence. To reach station from Big Lake go

south out of town along the west side of the railroad station, 0.75 mile from the railroad crossing to a gate; through gate and along main traveled road to a transmission line and 1.9 miles to a gate (Can't Sag Gate); go through gate and turn east into road along fence line and continue 1.0 mile to gate; go through gate and along same road 0.75 mile to steel windmill and dirt tank, continuing along same road 0.75 mile to another gate; go through gate, turn left and go 2 miles to fence corner and station. Station marked by U.S.G.S. aluminum disk set in a 3-inch pipe projecting 14 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1.5 feet south of east-and-west fence, and approximately 0.15 mile from station in azimuth $106^{\circ}07'48''$; no. 2 projects 6 inches above ground, is 1.5 feet south of east-and-west fence, and 334.7 feet from station in azimuth $168^{\circ}57'46''$. Azimuth from station of *Big Lake municipal water tank, finial*, is $126^{\circ}24'05''$.

Carroll (U.S.G.S.) (Reagan County, C. I. Aslakson, 1932).—About 5.5 miles south and 1 mile west of Big Lake, about 3 miles east by north of Carroll's ranch, on the north part of the summit of a gradual rise. To reach station from Big Lake go south from the crossing at the railroad station 0.4 mile, turn west and go 0.25 mile, then south 4 miles to a red, double, bumper gate; through gate and turn sharply west into road along fence line and continue 1.1 miles to point about 0.1 mile east of gate in fence line. Turn left across pasture, bearing a little east and go 0.5 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above the ground, and disk is stamped "Carroll, U.S.G.S. 1916, 1932." Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 7 inches above the ground, and is 111.32 feet from station in azimuth $43^{\circ}41'$; no. 2 projects 4 inches above the ground, is in telephone line, at base of telephone pole, and 0.25 mile (approximately) from station in azimuth $138^{\circ}56'54''$. Other azimuths from station are: *Shell pumping station, black water tank*, $98^{\circ}03'47''$; *Shell pumping station, storage tank, finial*, $97^{\circ}51'30''$; *Big Lake municipal water tank, finial*, $197^{\circ}01'34''$.

Powell (Crockett County, C. I. Aslakson, 1932).—About 14 miles, airline, southwest by south from Big Lake, in the northwest corner of sec. 62, block BB, on the southern one of two rises of ground in the central part of the Powell oil field, about 0.4 mile south and 0.1 mile east of a small, one-story, white schoolhouse, about 400 yards south of H. O. & R. rig no. 2B, on an outcrop of bedrock, on highest part of rise, which is rough, and is covered with scrub cedars and loose rocks. To reach station from Big Lake, go west on a road which parallels the railroad track and which was formerly Texas Highway No. 99, for the distance of 5.4 miles from the railroad station to an abandoned filling station on the left side of the road; turn left just west of this filling station on a graded road to south and go 12 miles to oil field. The field is traversed with a network of roads and trails. Go to schoolhouse and from there south on east side of schoolhouse about 250 yards to cattle guard; go through guard and on south 0.3 mile on east side of fence; turn east up-hill (no road or trail) and go 100 yards to station. Station marked by standard disk station mark in bedrock, note 2. Reference marks are standard reference disks in rock, note 12. No. 1 is 24.56 meters (80.6 feet) from station in azimuth $270^{\circ}57'$; no. 2, 100 meters (paced) (328 feet), $176^{\circ}10'02''$. Azimuth from station of *Shell pumping station, black water tank*, is $151^{\circ}33'39''$.

Schneeman (Crockett County, C. I. Aslakson, 1932).—About 15 miles south-southeast of Big Lake, on high point of ridge on the Schneeman ranch, about 1 mile south of prominent windmill on same ridge, 400 feet west and 10 feet south of blazed fence post in north-and-south fence line, and 1,650 feet south of an east-and-west fence line. To reach station from Big Lake railroad station go south 0.4 mile from the railroad crossing; turn west and go 0.25 mile; go south 4.0 miles to a red bumper gate; go through gate and continue on 2.25 miles to bumper gate; go through gate and continue 2.2 miles to bumper gate; go through gate and along main road to south and east 1.9 miles to a sign in road fork marked by a lazy JH brand and the name "McMichael." Follow left fork to the McMichael ranch; go through corrals and turn north along east side of a north-and-south fence 0.8 mile to a gate; go through gate and along plain road to right 1.5 miles to gate leading into a plot in which a windmill is located. Go through this gate and continue south along west fence line 1.4 miles to a gate on the right. Go through this gate and continue south along west side of fence line 0.2 mile to blazed post and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1

projects 6 inches above ground, is in the east-and-west fence line, and approximately 1,680 feet from station in azimuth $188^{\circ}34'58''$; no. 2 projects 6 inches above ground, is 1 foot west of the north-and-south fence line, 55 feet south of blazed fence post, and 405 feet from station in azimuth $243^{\circ}31'$. Azimuth from station of *Big Lake municipal water tank, finial*, is $167^{\circ}58'14''$; windmill, 1 mile distant, is $184^{\circ}57'37''$.

Crockett (Crockett County, C. I. Aslakson, 1932).—About 6 miles, airline, south of the little white schoolhouse in the Powell oil field, 3.7 miles by road south of the south end of the oil field, on top of a rocky ridge, on land of unknown ownership, 7.3 meters (24 feet) south and 9 meters (30 feet) east of the northwest corner of a field, 7.3 meters (24 feet) south and 15 meters (49 feet) west of west end of a cattle guard on the Powell-Ozona road. Four meters (13 feet) east of the east end of the cattle guard is a southwest fence corner and a wooden gate. To reach the station from the schoolhouse in the Powell oil field go south on the east side to a cattle guard at 0.2 mile; continue south 1.3 miles, keeping the main road which bears to the right to a Gulf gasoline pump; here take the left fork down a draw 0.6 mile to a cattle guard; cross the guard and go 0.5 mile to another cattle guard; cross this guard and bear slightly to the left and pass around the left side of a prominent ridge to the rig Shannon no. 1, one of the most southerly in the field. From this rig go south on the Ozona road (a dim trail) for 1.5 miles to a cattle guard; cross guard and continue south for 2.2 miles to another guard; cross guard and turn west to station, distant 15 meters (49 feet). Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in the east-and-west fence line, and 130 yards (paced) from station in azimuth $286^{\circ}08'08''$; no. 2 is 2 feet east of the north-and-south fence line, and 24.54 meters (80.5 feet) from station in azimuth $29^{\circ}26'$. Other azimuths from station are: Tip of wooden windmill 1 mile to east, in an east-and-west fence line, distant 1 mile $289^{\circ}32'23''$; tip of wooden oil derrick to the south (J. S. Todd, no. 1), $358^{\circ}55'21''$.

Shannon (Crockett County, C. I. Aslakson, 1932).—About 27 miles south of Big Lake, on the highest point of ridge of the Shannon ranch. To reach station from Big Lake railroad station, go south 0.4 mile from the railroad crossing; go west 0.25 mile; then south 4.0 miles to bumper gate; go through gate and on 2.25 miles to bumper gate; go through gate and 2.2 miles to bumper gate; go through gate and on 1.9 miles to sign in road fork with lazy JH brand and name "McMichael"; take right fork 0.5 mile to bumper gate; go through gate and along main road 1.8 miles to bumper gate; go through gate and continue down valley 1.0 mile to bumper gate; go through gate 2.5 miles to bumper gate; go through gate 1.1 miles to road fork; take left fork and go 0.2 miles to old oil well site; continue 0.75 mile to road fork, one fork going around hill to right and the other over saddle to left. Follow right fork down valley 1.2 miles to bumper gate; go through gate 1.25 miles to bumper gate at Shannon ranch house; go through gate and around to right of ranch house to a road leading up the valley to left; go 1.2 miles to gate; go through gate 1.75 miles to windmill and concrete stove tank on left; continue on road up valley 0.4 mile to fork; take left fork and go 1.0 mile to crest of ridge; turn sharply to right and go across country 0.75 mile to high point of ridge and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above the ground, is 1.7 feet north of an east-and-west fence line, and 675 feet (approximate) from station in azimuth $327^{\circ}42'32''$; no. 2, projects 6 inches above ground, and is 63.70 feet from station in azimuth $72^{\circ}30'$. Azimuth from station of lone oil derrick, distant 5 miles, is $75^{\circ}04'44''$.

Todd (Crockett County, C. I. Aslakson, 1932).—About 16 miles, airline, south of the Powell oil field schoolhouse, about 19 miles west and 5 miles north of Ozona, about 2.75 miles south by east from the J. S. Todd oil rig, on land owned by J. S. Todd, on the highest ground in the immediate vicinity, in a mesquite and juniper covered pasture, about 0.2 mile west of an old trail along the mesa, 0.25 mile west of a small reservoir, and on a line passing through a small whitecapped butte (see below) and a point approximately 75 feet south of the reservoir. To reach this station from station *Crockett* (see description thereof), follow road south 2.75 miles to a bumper gate; go through gate and along road 0.5 mile to a crossroad; keep straight ahead 1.1 miles to where road crosses cattle guard onto a graded road; follow graded road 3.7 miles to dim crossroad; turn right across an 8-inch pipe culvert and follow dim road toward windmill 1.25 miles; bear left and go through red board gate; from gate follow road to south up ravine and out on top

for 2.2 miles to fork; double back sharply to left and go 0.35 mile to small reservoir; here leave road, bear right and go up-hill 0.25 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 24.58 meters (80.6 feet) from station in azimuth $281^{\circ}03'$; no. 2, 130 meters (paced) (427 feet), $171^{\circ}47'52''$. Other azimuths from station are: *University of Texas, survey station*, on small white-topped butte (see above) about 10 miles distant, $287^{\circ}06'30''$; tip of lone wooden oil rig, J. S. Todd, 2 miles distant, $150^{\circ}00'18''$.

University (Crockett County, C. I. Aslakson, 1932; 1933).—About 21 miles west and 1.5 miles south of Ozona, in the southwest part of block 30, on land owned by the University of Texas, about 2 miles southeast of the head of a large draw, about 2 miles south of the Old Spanish Trail Highway, 10 meters (33 feet) west of an old trail along the ridge on gently rolling grass land. To reach the station from Ozona, go west on the Old Spanish Trail (United States Highway 290) 22.6 miles from the courthouse to a cattle guard; go through guard along highway 0.1 mile; turn left on dim road just beyond a pipe line running southeast and northwest across road, and go 0.2 mile to gate; go through this gate and follow along pipe line 100 yards; turn sharply to right and follow dim trail which parallels highway to southwest; pass around to right of head of draw and go 2.6 miles southeast to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 2 meters (7 feet) east of old trail along ridge, and 0.15 mile from station in azimuth $175^{\circ}10'15''$; no. 2 is 26.45 meters (86.8 feet) from station in azimuth $66^{\circ}37'$. Other azimuths from station are: Tip of steel windmill 1.5 miles distant, $92^{\circ}43'53''$; tip of wooden windmill 1 mile south of steel windmill (above), $71^{\circ}02'41''$.

Massie (Crockett County, C. I. Aslakson, 1932).—About 10.5 miles northwest of Ozona, on highest ground in the vicinity, about 0.5 mile northwest of a locked gate in fence line along east side of University of Texas land in block 31. To reach station from Ozona go north out of town on road along front of Hotel Ozona, 0.4 mile from hotel to street intersection with grey stucco house in southwest corner; turn left one block; turn right onto winding road leading out to the northwest to a cattle guard; cross guard and go 0.5 mile to another cattle guard just south of ranch house; cross this guard and continue on road toward house and on to northwest 2.0 miles to a gate; go through gate and take right-hand road for 0.15 mile; take right-hand road and go 1.75 miles to gate at windmill and stone tank; go through gate and along road to left past windmill 2.4 miles to fork; take left fork, leaving the main traveled road, and go 0.4 mile to gate at wooden windmill; go through gate and on 3.0 miles to steel windmill and pond; thence westward 1.0 mile to a locked gate; through gate and 0.5 mile northwest to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in boulders, note 12 (d). No. 1 is 252.80 feet from station in azimuth $297^{\circ}32'$; no. 2, approximately 975 feet from station in azimuth $49^{\circ}58'24''$. Other azimuths from station are: *University of Texas, land corner 27*, distant 13.450 meters (44.1 feet), $88^{\circ}42'$; steel windmill, 3 miles distant $279^{\circ}44'01''$; Texaco water tank approximately 4 miles distant, $349^{\circ}21'11''$; east edge of sharp hill showing over ridge to southwest, $46^{\circ}10'$.

Longhorn (Crockett County, C. I. Aslakson, 1932).—About 19.5 miles, airline, west by south of Ozona, about 3.5 miles, airline, southeast of station *University*, in the southeast corner of a University of Texas tract of land, on a flat-topped brushy rise of ground. To reach station from Ozona go west on the Old Spanish Trail Highway (United States Highway 290) from the point where it turns from south to west at the south end of town 23.6 miles to a cattle guard in the bottom of a little valley; 0.1 mile beyond the guard turn left off the highway on a dim trail just beyond a pipe line; go 0.2 mile from highway to gate, through gate, and turn half right on a dim trail which parallels the highway to the southwest. Turn right around the head of a large draw and then turn southeast and continue on to a gate which is 4.0 miles from the gate just south of the highway. Go through gate and follow road 0.4 mile to a cross road in a rocky draw. Keep straight ahead across this draw and go 1.0 mile to a gate; go through gate and along road 0.8 mile, then bear off to left from road and go 0.25 mile to station on high ground. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark no. 1 is a standard reference disk set in rock outcrop flush with ground, note 12, at edge of slope at northwest head of canyon, 275 yards (paced) from station, in azimuth $226^{\circ}03'21''$. Reference mark no. 2

is standard reference disk in concrete, note 11 (a), 20.50 meters (67.3 feet) from station in azimuth $124^{\circ}18'$. Other azimuths from station are: *University of Texas, survey station*, distant 2 miles, $157^{\circ}20'01''$; *University of Texas, survey station*, distant 5.455 meters (17.90 feet), $175^{\circ}24'$; wooden windmill, distant 2 miles, $47^{\circ}59'00''$.

Lee (Crockett County, C. I. Aslakson, 1932).—About 25 miles, airline, west-southwest of Ozona, about 3 miles south by east of Paul Perner's ranch house, about 0.2 mile north of an east-and-west fence, about 0.1 mile west of a north-and-south road, on a rise of high ground belonging to Pat Lee. To reach station from Ozona go West on United States Highway 290 from south end of Main Street 25.4 miles to a well defined road leading south through a board gate. Go south through gate and follow main traveled track through pastures 7.5 miles to the Perner ranch house; from Perner windmill continue southward along ridge 1.4 miles to wire gate just east of a board gate; go through wire gate 0.5 mile to pipe line; cross pipe line and continue along road down ridge 1.4 miles, then leave road and bear to right about 0.1 mile to highest part of ridge in the vicinity and the station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is a little to the right of the line to the Perner windmill, and 108 yards (paced) from station in azimuth $175^{\circ}15'11''$; no. 2 is 29.51 meters (96.8 feet) from station in azimuth $64^{\circ}35'$. Other azimuths from the station are: *University of Texas, survey station*, 5.5 meters (18 feet) north of station *Longhorn*, $208^{\circ}20'00''$; tip of vertical shaft, wooden windmill at Paul Perner ranch, distant 3 miles, $171^{\circ}46'49''$.

Henderson (Crockett County, C. I. Aslakson, 1932).—About 12 miles south-southwest of Ozona, on the Roy Henderson ranch, 0.5 mile north of road leading to the ranch house, on a small rocky rise. To reach station from Ozona follow United States Highway 290, from point where highway turns north 4.5 miles to a graded road on the left; follow graded road 3.8 miles to gate on right opposite windmill and concrete tank on left; go through gate and continue 0.6 mile to a "Can't Sag Gate"; pass through gate and go 0.6 mile to another gate; go through this gate and 0.15 mile to a fork; take left fork and go 0.2 mile to gate; go through gate and follow ranch road 2.0 miles to a gate, continuing on main road 3.0 miles to a road fork; take left fork and go 0.5 mile, then turn right across country and go 0.4 mile to a small rocky rise and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 0.2 mile (approximate) from station in azimuth $307^{\circ}18'10''$; no. 2, 48.18 feet, $42^{\circ}54'$. Azimuth from station of windmill 1 mile distant, is $193^{\circ}04'28''$.

Hoover (Crockett County, C. I. Aslakson, 1932).—Thirty miles, airline, south-west of Ozona, on the Hoover estate, 0.6 mile north of the ranch house occupied by George Montgomery, 8 feet east of north-and-south fence and telephone lines, in a rocky sheep pasture thickly overgrown with scrub cedar, mesquite, and cactus. To reach station from Ozona go west on the Old Spanish Trail Highway (U.S. Highway 290) from south end of main street 26.4 miles to a well-traveled road leading south through a board gate; go through gate and follow main road through pastures 7.5 miles to the Perner ranch house; from ranch house follow road down ridge to southward 1.4 miles to a wire gate just east of a board gate; go through wire gate and on 0.5 mile to pipe line; cross road along pipe line and continue along road down ridge to a wire gate; pass through gate and go 0.25 mile to where right fork of ridge road comes in. Keep straight ahead to south and follow main road down ridge 10.0 miles to gate leading in to Montgomery's house, keeping straight ahead at all forks. At this gate turn back sharply to the right and go north along the east side of the fence 0.6 mile to the station. Montgomery's house is the first one along the ridge road south of Perner's. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks. No. 1 is in rock, note 12, 82 meters (269 feet) east of fence line, and 87 meters (285 feet) (paced) from station in azimuth $231^{\circ}43'$; no. 2 is in concrete, note 11 (a), 6 meters (20 feet) east of fence line, and 31.27 meters (102.6 feet) from station in azimuth $345^{\circ}20'$. Azimuth from the station of tip of windmill (wooden) at Montgomery's ranch, distant 0.5 mile, $358^{\circ}04'23''$. Station *Mitchell* (see description thereof) can be seen by erecting a stand.

Pierce (Crockett County, C. I. Aslakson, 1932).—About 22 miles, airline, southwest of Ozona, on a high point of ridge on ranch of Vic Pierce, about 2.5

miles by road southwest of the ranch house, 0.2 mile north of a tin-roofed shed and shearing pens, and 30.65 feet east of a north-and-south fence line. To reach station from Ozona, go out of town on United States Highway 290, 4.5 miles from point where highway turns north to a graded road on the left; follow graded road 7 miles to bumper gate; go through gate and take left-hand road, leaving main road, and go 2.5 miles to ranch house with three windmills; go through gate to left and follow plain road, swinging to right to another gate; go through gate and continue on main traveled road 11 miles to forks at the Vic Pierce ranch; take right fork over to green gate and follow road 1.2 miles to plank gate; go through gate and continue on 0.8 mile to gate; go through gate and continue on 0.6 mile to tin-roofed shack and shearing pens; turn right and follow fence about 0.2 mile to high point and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 5 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 11 inches above ground, and is 75.90 feet from station in azimuth $223^{\circ}06'$; no. 2 projects 12 inches above ground and is 550 feet from station in azimuth $331^{\circ}07'58''$. Azimuth from station of windmill, distant 2 miles, is $25^{\circ}51'29''$.

Mitchell (Crockett County, C. I. Aslakson, 1932).—About 36 miles southwest by south of Ozona, 12 miles north-northwest of Pandale post office on a flat-topped, bushy rise of ground, on land owned by John Mitchell. To reach station from station Hoover (see description thereof) go south along fence to George Montgomery's ranch house; pass through gate to south on east side of Montgomery's corrals and follow main road 4.0 miles to Rowdy Hoover's ranch house; from Hoover's house take right fork, go through gate in north-and-south fence about 100 yards south of house; follow this road 2.0 miles to gate; go through gate and continue along main road, passing a steel windmill one-fourth mile to left at 0.3 mile, and reaching gate at 1.5 miles; pass through gate and go along main road 0.2 mile to fork at fence corner; follow right fork 0.5 mile, then bear to right up slope to top of rise and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in rock outcrop, note 12 (a). No. 1 is 173 yards (paced) from station in azimuth $350^{\circ}02'25''$; no. 2, 42.35 meters (138.9 feet), $80^{\circ}44'$. Azimuth from station of wood windmill, tip of shaft, distant 1 mile, is $327^{\circ}14'26''$.

Cauthorn (Val Verde County, C. I. Aslakson, 1932; 1933).—About 11 miles, airline, east of Pandale, about 600 feet south of the Pandale-Comstock Road, and 39 feet southwest of old road, on the highest point of a rocky ridge. To reach station from Pandale go north from ranch 0.3 mile to school, turn right onto Pandale-Comstock Road, and continue 12.6 miles to first cattle guard after passing bumper gate on east boundary of Wardlaw ranch, cross guard and go about 250 feet to point about midway between second and third telephone poles; turn right off road and go about 600 feet to natural rock pile and station. There is a ranch across the road from the station, about 0.5 mile distant. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 4 inches above ground (rock pile). Reference marks are standard reference disks in concrete in outcropping bedrock, note 12 (b). No. 1 is 335 feet from station in azimuth $224^{\circ}22'26''$; no. 2, 84.10 feet, $127^{\circ}35'$.

Mills (Val Verde County, C. I. Aslakson, 1932).—About 4 miles, airline, northwest of Pandale post office, on land owned by Mr. Mills of Pandale, on the crest of a ridge, 7 meters (23 feet) south of an east-and-west fence. To reach station from Pandale post office go northeast along road 0.4 mile to bumper gate at school house; pass through gate, take left fork 1.3 miles to another gate; pass through gate and bear left off main road onto a dim road that leads westward up the canyon. Follow dim road 0.8 mile to sheep corrals; pass through corrals into pasture containing wind mill on north side of an east-and-west fence; follow very dim old road westward up canyon along fence about 1.0 mile to an old camp site alongside fence. Trucks can go no further. From this point walk along fence to highest point of ridge and station. Station is marked with a standard disk station mark in bedrock, note 2; disk marked "Established by Corps of Engineers U.S.A." Reference marks are standard reference disks in bedrock, note 12 (a). One is marked in a similar manner to the station disk. No. 1 is in rock outcrop, 15.17 meters (49.8 feet) from station in azimuth $247^{\circ}25'$; no. 2 is across draw, near a small cairn, 0.2 mile (approximate) from station, in azimuth $343^{\circ}10'16''$. The azimuth from station of largest and middle one of three windmills on horizon to northwest near a house is $152^{\circ}13'29''$.

Supplementary points

Butterfield eccentric (Armstrong County, E. O. Heaton, 1921).—An unmarked point 8.905 meters (29.22 feet) in azimuth $182^{\circ}20'$ from station *Butterfield* (see description thereof).

Hale County, southeast corner (Hale County, C. I. Aslakson, 1932).—This point is the southeast corner of Hale County, as determined by W. J. Williams, a State and court surveyor. It is reached from south edge of Petersburg by going east 1.1 miles to cemetery on right side of road, then south 0.2 mile, east 0.6 mile, south 2.6 miles, and east one-fourth mile to gate on north side of road. Pass through gate and go northeast over winding road about one-third mile to station, which is about 100 yards south-southwest of a house on summit of small hill. Station is marked by a small truncated pyramid from which a 2-inch galvanized iron pipe projects about 4 feet. Pipe is flattened at the top. Azimuth from station: *Idalou municipal water tank, final*, $30^{\circ}25'56''$; *Petersburg, railroad water tank, final*, $148^{\circ}31'08''$.

B.M. J 71 (Lubbock County, C. I. Aslakson, 1932).—About 1.2 miles southeast of Posey, on Panhandle and Santa Fe Railway, at northwest end of largest cut between Lubbock and Slaton, 51 feet southwest of track, and 25 feet northwest of milepost 686. Mark is standard bench mark disk, stamped "J 71 1930", set in top of concrete post. Station *B.M. J 71 eccentric* (see description thereof) is 4.943 meters (16.22 feet) from station in azimuth $204^{\circ}04'$.

E.S.E. Lubbock (Lubbock County, C. I. Aslakson, 1932).—A point established by W. J. Williams, a court and State surveyor, near the southeast corner of Lubbock County. Marked by a small concrete pyramid, and its position determined by a traverse from station *Poole* (see description thereof) which is about 2 miles to the west. Station reached from Slaton by following the highway southeast from city hall 4.8 miles to a road leading east across the railroad track, thence 3 miles east on this road, and south 1.2 miles to the station, which is about 200 yards west of the road, and in ground at present uncultivated, but the future cultivation of which may destroy the station.

Poole (Lynn County, C. I. Aslakson, 1932).—This is a second-order station, about 5 miles airline southeast of the town of Slaton, established for the purpose of determining, by traverse connection, the corner known as *E.S.E. Lubbock*. To reach from Slaton, go southeast on main highway 4.8 miles to point where side road crosses tracks to east and highway continues on. Continue on highway about 100 yards to side road leading west, go west about one-half mile, then south about one-fourth mile, jog west about 200 yards, then south about 1 mile to station in fence line on east side of road. There is a farm about 1 mile north of station on east side of road at point where road makes a short jog to south. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line on east side of road, 100.04 feet from station, in azimuth $1^{\circ}25'$; no. 2 is in fence line on west side of road, 43.85 feet from station, in azimuth $115^{\circ}46'$. Azimuth from station to *Slaton municipal water tank, final*, is $137^{\circ}47'48''$. Station *E.S.E. Lubbock* (see description thereof) is 3,235.09 meters (10,613.8 feet) from station in azimuth $261^{\circ}57'20''$.

WACO-MANSFIELD ARC

Principal points

Pancake (Coryell County, C. L. Garner, 1919).—About 6 miles east of Jonesboro, 6 miles west of Turnerville, $1\frac{1}{2}$ miles northwest of the small settlement of Pancake, and about 120 meters (394 feet) northwest of house rented by John Farquhar and owned by J. F. Dulaney. Station is in edge of cultivated field, 10 meters (33 feet) west of road leading northwest from Pancake. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is nail in rough mass of concrete marked with an arrow pointing the station. It is 2 feet west of wire fence to east of road, and is 13.24 meters (43.4 feet) from station, in azimuth $222^{\circ}41'$. Elevation of station, 374.6 meters (1,229 feet).

Rainer (Coryell County, C. L. Garner, 1919).—Six miles east of Gatesville, about one fourth mile south of the Gatesville-Osage road, 210 meters (689 feet) north of the Gatesville-Waco mountain road, 10 meters (33 feet) west of the center

of a short road connecting these two roads, and in the edge of a field owned by K. C. Rainer or by a Mr. Hassell, and cultivated by J. L. Burt, living about one-fourth mile northeast of the station. There is a wire fence along each side of the road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 30.09 meters (98.7 feet) from station, in azimuth $190^{\circ}49'$. Elevation of station, 322.8 meters (1,059 feet.).

Myers (Coryell County, C. L. Garner, 1919).—Four miles west of Mosheim, 13 miles west of Valley Mills, and 250 meters (820 feet) north of the Valley Mills-Turnerville road, in edge of pasture owned by H. W. Myers and rented by R. A. Anz. Station is about 80 meters (262 feet) in azimuth $110^{\circ}51'$ from the Myers house, and 35 meters (115 feet) north of barn. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a nail set in an irregular mass of concrete (nearly square), placed by the side of the picket fence which is around the house; it is 63.68 meters (208.9 feet) from the station, in azimuth $289^{\circ}01'$. Elevation of station, 322.4 meters (1,058 feet.).

Oglesby (Coryell County, C. L. Garner, 1919).—On top of a cultivated hill, on land belonging to Jim Caudle, about one fourth mile north of his house, and $1\frac{1}{2}$ miles northwest of the town of Oglesby. Station is about 400 to 500 meters (1,312 to 1,640 feet) north of the road leading west in front of Caudle's house and 5 meters (16 feet) east of a turn row in the field. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 24.85 meters (81.5 feet) from the station, in azimuth $17^{\circ}05'$. It is about 4 meters (13 feet) west of the turn row. Azimuth from station to *Oglesby, Farmers Union Gin stack*, distant about 2 miles, is $320^{\circ}55'08''$. Elevation of station, 274.9 meters (902 feet.).

Simpson (McLennan County, C. L. Garner, 1919).—About 4 miles south of Valley Mills, 7 miles northwest of Crawford, 2 miles southwest of the Crawford-Valley Mills road, on top of a flat hill in pasture owned by D. R. Simpson, and east of his house. An old United States Geological Survey triangulation station is on this hill, marked by a drill hole and letters in a flat rock set in the surface of the ground. It does not appear to have been disturbed. It is 61.07 meters (200.4 feet) from the station, in azimuth $218^{\circ}01'$. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark, a nail set in a square mass of concrete, is by the side of the fence around Mr. Simpson's house, and is 110.76 meters (363.4 feet) from the station in azimuth $19^{\circ}47'$. Simpson's house is 115 meters (377 feet) from station, in azimuth 21° . Elevation of station, 261.1 meters (857 feet.).

Barcus (McLennan County, C. L. Garner, 1919).—About 9 miles by road southwest of Waco, 3 miles by road southeast of South Bosque, about 2 miles southwest of the Waco-McGregor road, 150 meters (492 feet) north of the Waco-Moody road at a point 2 miles southwest of where that road branches off from the Waco-McGregor road, and 100 meters (328 feet) north of the house of W. J. Barcus, in the edge of a cultivated field, 6 meters (20 feet) east of the center of a lane which leads to a pasture. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 1 foot east of wire fence and 5 meters (16 feet) east of center line of above lane and 62.37 meters (204.6 feet) from station, in azimuth $167^{\circ}55'$. *Barcus, church east of*, is distant 0.7 mile in azimuth $241^{\circ}50'53''$. Elevation of station, 227.5 meters (746 feet.).

Payne (McLennan County, C. L. Garner, 1919).—About three-fourths mile northwest of China Spring, one-half mile northeast of the China Spring-Valley Mills road, on top of a hill in cultivated field belonging to G. W. Payne. Station is about one-fourth mile north-northwest of Payne's house, in corner of field, 5 meters (16 feet) south of wire fence and farm of George Harris, and 6 meters (20 feet) east of wire fence and farm of Ned Murray. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 35.10 meters (115.2 feet) from station, in azimuth $229^{\circ}39'$. It is alongside of wire fence on dividing line between farms of Ned Murray and George Harris. Azimuth from station to *China Spring, church*, distant 1.4 miles is $316^{\circ}12'04''$. Elevation of station 199.2 meters (654 feet.).

Battle (McLennan County, C. L. Garner, 1919).—About 5 miles northwest of Mart, 1 mile east of Battle, 325 meters (1,066 feet) E. 17° S. from J. M. Davlin's

house, on top of a cultivated field belonging to Mrs. A. J. Thompson of Mart, Tex. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), set on the east side of the road which leads west to the county line road, under the wire fence, and 4 meters (13 feet) from the center of the road. It is 234.74 meters (770.1 feet) from station, in azimuth $148^{\circ}59'$. *Mart water tank*, distant 3.7 miles, is in azimuth $297^{\circ}32'36''$ from station. Elevation of station, 182.7 meters (599 feet).

West (McLennan County, C. L. Garner, 1919).—About 1 mile south of the town of West, 300 meters (984 feet) west of the Texas Electric Railway, 80 meters (262 feet) east of the West-Tokio road, in edge of a pasture and 45 meters (148 feet) southwest of a house belonging to G. R. Hurlock, and rented by L. D. Williams. Station is 8 meters (26 feet) west of wire fence and field. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed alongside the fence around the house, and 38.94 meters (127.8 feet) from the station, in azimuth $242^{\circ}42'$. The azimuth of *West, tall red church spire*, distant 1 mile, is $194^{\circ}16'07''$. Elevation of station, 198.9 meters (653 feet).

Willie (Limestone County, C. L. Garner, 1919).—About 4 miles south of Mount Calm, 5 miles northwest of Prairie Hill, on a flat hill, 30 meters (98 feet) south of Percy Willie's house, in a lane leading to his barns and pasture, and about 20 meters (66 feet) from the gate to the pasture and lot. The station is 2 meters (7 feet) north of wire fence on south side of lane. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed about 3 feet from the north post of gate entering pasture, and 21.38 meters (70.1 feet) from station, in azimuth $125^{\circ}52'$. *Prairie Hill church spire*, distant about $5\frac{1}{2}$ miles, is in azimuth $313^{\circ}50'19''$ from station. Elevation of station, 210.4 meters (690 feet).

Horn (Limestone County, C. L. Garner, 1919).—About $7\frac{1}{2}$ miles west-northwest of Groesbeck, and 17 miles east of Mart, on the north slope of a prominent and well-known hill called "Horn Hill." Station is about 400 meters (1,312 feet) north of R. H. Stricklin's house and on his land, about 56 meters (184 feet) west of road leading to Stricklin's house from Groesbeck, 50 meters (164 feet) east of sharp descent of hill, and about 45 meters (148 feet) north of the heaviest woods. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark no. 1 is a standard reference disk in bedrock, note 12 (b), 36.45 meters (119.6 feet) from station in azimuth $345^{\circ}08'$; reference no. 2 is a cross chiseled in top of an outcropping boulder, 37.61 meters (123.4 feet) from the station, in azimuth 253° . A small house is about 100 meters (328 feet) to the north. *Groesbeck courthouse finial* is $7\frac{1}{4}$ miles distant in azimuth $285^{\circ}40'13''$. Elevation of station, 202.3 meters (664 feet).

Hubbard (Hill County, C. L. Garner, 1919).—About 3 miles south-southwest from Hubbard, 80 meters (262 feet) northwest of the Hubbard-Mount Calm road, 25 meters (82 feet) northwest of the St. Louis Southwestern Railway tracks, and 13 meters (43 feet) west of the right-of-way fence, on or in edge of pasture owned by K. L. Kent. Station is about 250 meters (820 feet) southwest of house of C. L. McWilliams and about 75 meters (246 feet) south of a division fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is a standard reference disk in concrete, note 11 (a), 29.825 meters (97.85 feet) from station, in azimuth $16^{\circ}25'$. *Hubbard standpipe* is distant $2\frac{3}{4}$ miles in azimuth $214^{\circ}52'12''$. Elevation of station, 206.4 meters (677 feet).

Tehuacana (Limestone County, C. L. Garner, 1919).—In the southern part of the town of Tehuacana, on the highest point of the ridge, about 150 meters (492 feet) west of the Tehuacana-Mexia road, in a small vacant lot owned by W. C. McAfee, 35 meters (115 feet) north of his house, and about 15 meters (49 feet) east of his stables. Surface mark is standard disk station mark set with cement in large outcropping boulder or bedrock. Reference mark is a standard reference disk set with cement in large outcropping boulder or bedrock; it is 36.59 meters (120.0 feet) from the station, in azimuth $1^{\circ}57'$. Azimuth of *Tehuacana Westminster College*, one-half mile distant, is $207^{\circ}16'47''$. Elevation of station, 201.5 meters (661 feet).

Fallon (Limestone County, C. L. Garner, 1919).—About 1.1 miles east 25° south from Fallon, 9.5 miles southeast of Mexia, 11 miles southwest of Teague, one-fourth mile north of the Houston & Texas Central Railroad tracks, on a flat sandy hill known by some as "Gordon's Hill" and owned by W. S. Hughes.

Station is 225 meters (738 feet) northeast of house rented by B. S. Johnson. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark, a standard reference disk in concrete, note 11 (a), is near the house rented by Johnson, and is 211.64 meters (694.4 feet) from the station, in azimuth $78^{\circ}51'28''$. Azimuth of *Groesbeck standpipe*, distant $9\frac{1}{4}$ miles, is $70^{\circ}02'12''$. Elevation of station, 172.66 meters (566.5 feet).

Kirvin (Freestone County, C. L. Garner, 1919).—About 3 miles south of the town of Kirvin, 7 miles north of Teague, one-fourth mile east of the Trinity & Brazos Valley Railway and the Teague-Kirvin road, on a flat sandy hill, in the edge of a cultivated field owned by J. C. Meriott, and about 40 meters (131 feet) east of a small negro house on Meriott's place. Station is in corner of field 6 meters (20 feet) from a wire fence to east, and about 12 meters (39 feet) from wire fence to north. Station is also about 350 meters (1,148 feet) northeast of Meriott's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 61.26 meters (201.0 feet) from a station, in azimuth $99^{\circ}01'$. Azimuth of *Teague tall water tank*, distant $6\frac{1}{4}$ miles, is $335^{\circ}50'46''$. Elevation of station, 162.8 meters (534 feet).

Teague (Freestone County, C. L. Garner, 1919).—About $2\frac{1}{2}$ miles east of Teague, one-fourth mile north of the Teague-Dew-Oakwood road, in the southwest corner of a field owned by a Mr. Butler, and 200 meters (656 feet) north of house of J. H. Hullem. Station is between forks of road, one of which leads to north and the other to east, and is on line of wire fence to north of the east road, 21 meters (69 feet) east of center line of other (north) road, and 1 meter (3 feet) south of edge of field. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in the corner of a fence, in Mr. Hullem's pasture, about 40 meters (131 feet) north of his house, and 151.85 meters (498.2 feet) from the station, in azimuth $43^{\circ}56'57''$. *Teague, high school, dome with flagstaff*, distant 2.2 miles, is in azimuth $95^{\circ}01'46''$. Elevation of station, 170.1 meters (558 feet).

Pilot (Freestone County, C. L. Garner, 1919).—On the highest part and southern end of Pilot Knob, a very prominent and well-known hill about 7 miles to the east of Fairfield and about 3 miles north of church and store known locally as Turlington. The hill is about 300 yards east of a Mr. Perkins' house and 200 meters (656 feet) west of a public road leading north from a church and forks of road known locally as Antioch. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 19.98 meters (65.6 feet) from station, in azimuth $145^{\circ}07'$. The azimuth from the station of the axis ridge of Pilot Knob is $148^{\circ}09'$, and of smokestack at Palestine, $268^{\circ}23'53''$. Elevation of station, 184.0 meters (604 feet).

Burleson (Freestone County, C. L. Garner, 1919).—On top of Burleson Hill, a well-known and prominent hill 12 miles east of Teague, 2.5 miles east of Dew, one-fourth mile north of the Teague-Dew-Butler road, and about one-fourth mile north of house rented by Bill Evans. Property is owned by A. H. Baund. Station is on the highest point of hill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is on the north slope of hill, about 2 feet lower than station, and is marked by standard reference disk in concrete, note 11 (c), placed 28.12 meters (92.3 feet) from station, in azimuth $318^{\circ}14'$. Chimney of white house (E. W. Long's) on Dew-Butler road is distant about one-fourth mile in azimuth $352^{\circ}56'$ from station. Elevation of station, 185.2 meters (608 feet).

Lee (Freestone County, C. L. Garner, 1919).—About 4 miles north of Oakwood, 4 miles south of Butler, one-third mile west of the Oakwood-Butler road, on top of a sandy cultivated hill owned by Ben Lee (colored), whose house is about 100 meters (328 feet) to the northeast. Station is about 30 meters (98 feet) north of a lane leading to the east, while the route to the station from the Butler-Oakwood road is along a long narrow lane and in deep sand. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 35.43 meters (116.2 feet) from the station, in azimuth 312° . Azimuth of tall smokestack at Palestine is $238^{\circ}28'12''$. Elevation of station, 135.6 meters (445 feet).

Wilkerson (Anderson County, C. L. Garner, 1919).—About 13.5 miles north of Palestine, $2\frac{1}{2}$ miles northwest of Concord, on top of a cultivated field, about 300 meters (984 feet) west of Mrs. M. A. Wilkerson's house, and on her land

Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in the edge of the woods, 69.04 meters (226.5 feet) from the station, in azimuth $88^{\circ}22'01''$. The azimuth of south corner of Mrs. Wilkerson's house (front porch) from the station is $276^{\circ}41'$. Elevation of station, 233.0 meters (764 feet).

Concord (Anderson County, C. L. Garner, 1919).—About $4\frac{1}{4}$ miles east of north from Palestine, 65 meters (213 feet) east of the Palestine-Concord Road, on top of a long flat hill grown-up principally in oak and hickory, and opposite a negro tenant house and cultivated field which are on the west side of the road. Land is owned by Judge Gardner of Palestine. Long hill on which station is located is about $2\frac{1}{2}$ miles north of where road forks, one road leading to Concord, and the other to Middle Athens. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (c), placed 4 meters (13 feet) east of center of road and just in edge of woods. It is 65.14 meters (213.7 feet) from station, in azimuth $34^{\circ}56'47''$. Elevation of station, 214.5 meters (704 feet).

Camp (Anderson County, C. L. Garner, 1919; 1933).—About 8 miles southeast of Palestine, 300 meters (984 feet) north of the Palestine-Slocum Road, 50 meters (164 feet) north of E. K. Camp's house, in edge of field, about 51 meters (167 feet) north of the northeast corner of yard fence, and 6 meters (20 feet) east of east line of peach trees in orchard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in edge of Mr. Camp's back yard, near the fence, and 33.42 meters (109.6 feet) from the station, in azimuth $345^{\circ}44'$. The azimuth of the *Palestine courthouse statue*, distant about $7\frac{1}{4}$ miles, is $133^{\circ}23'08''$. In 1933 the station and reference marks were reported in good condition. Station 21 feet east of peach tree row. Elevation of station, 199.8 meters (656 feet).

Crockett (Cherokee County, C. L. Garner, 1919).—Six and one-half miles southwest of Rusk, 1 mile northwest of the Rusk-Crockett Road, on the western extremity of a long irregular wooded ridge with its major axis running in an east-and-west direction. The station is on ground that is quite flat and it will be hard to find when the tower is removed. To reach the station from Rusk follow the road toward Crockett 6.4 miles to top of a long hill. At top of hill an old logging road leads up the ridge sharply to the north. Follow this road $1\frac{1}{4}$ miles to station, which is in the center of the road; the road is dim and goes a little further up the ridge. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 27.70 meters (90.9 feet) from the station, in azimuth $80^{\circ}18'$. The azimuth of *Rusk asylum standpipe* distant $6\frac{1}{2}$ miles is $198^{\circ}56'58''$. Elevation of station, 210.4 meters (690 feet).

Lloyd (Cherokee County, C. L. Garner, 1919).—About 6 miles west of Jacksonville, 70 meters (230 feet) north of the center of the Jacksonville-Cary Lake Road, on a flat hill, which is sometimes cultivated, belonging to the sister of W. L. Lloyd who has charge of the property. Station is in the edge of the pasture, 90 meters (295 feet) northeast of the negro tenant house on the north side of the road. Small brush, mostly plum bushes, are all around the station. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is copper bolt in concrete, note 7 (b). Reference mark is standard reference disk in concrete, note 11 (a), 80.49 meters (264.1 feet) from station, in azimuth $55^{\circ}10'$. The azimuth of the Baptist University at Jacksonville, distant about 5 miles, is $268^{\circ}45'27''$. Elevation of station, 218.2 meters (716 feet).

Rusk (Cherokee County, C. L. Garner, 1919).—About 2 miles northeast of Rusk, about one-fourth mile eastward of the upper Rusk-Ponta Road and the same distance north of the lower Rusk-Ponta Road, in a cultivated field belonging to Arthur W. Smith, and about one-fourth mile north of his house. Reached from Rusk by proceeding along the road to Ponta for about 2 miles, to top of long steep hill, then taking the second right-hand road after top of hill is reached. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference in concrete, note 11 (a), placed in the edge of a hedge, 86.82 meters (284.8 feet) from the station, in azimuth 179° . A red tank near a red barn about one-fourth mile west of Smith's house is about one-half mile from station in azimuth $36^{\circ}33'$. Elevation of station, 226.0 meters (741 feet).

Smith (Cherokee County, C. L. Garner, 1919).—About 12 miles directly east of Jacksonville, $1\frac{1}{2}$ miles south of Summerfield, about three-fourths mile west of the Summerfield-Rusk Road, on top of a flat cultivated field belonging to Elgin Smith, on north side of a newly cleared field, 5 meters (16 feet) south of an east-and-west wire fence and edge of woods. Surface mark is standard disk station mark in concrete, note 1 (a). Underground mark is copper bolt in concrete, note 7 (b). Reference mark is a standard reference disk in concrete, note 11 (a), 24.85 meters (81.5 feet) from station, in azimuth $260^{\circ}21'$. The azimuth of the cupola of the school building at Summerfield, distant about $2\frac{1}{2}$ miles, is $225^{\circ}53'50''$. Elevation of station, 180.9 meters (594 feet).

Jacksonville south base (Cherokee County, C. L. Garner, 1919).—About 5 miles south of Jacksonville, 125 meters (410 feet) west of the Jacksonville-Rusk Road, 83 meters (272 feet) northwest of the northwest corner of Liberty school-house, 8 meters (26 feet) north of road leading up narrow lane with field on each side, and in edge of field belonging to C. M. Caron. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed 1 meter (3 feet) east of fire fence in the direction of the school building, 35 meters (115 feet) from northwest corner of school building, and 52.08 meters (170.9 feet) from station in azimuth $301^{\circ}29'$. Azimuth of *Jacksonville city water tank*, distant about $4\frac{1}{2}$ miles, is $163^{\circ}17'34''$. Elevation of station, 210.3 meters (690 feet).

Jacksonville north base (Cherokee County, C. L. Garner, 1919).—About 1 mile northeast of Jacksonville, one-half mile west of the Jacksonville-Tyler Road, on top of a sandy hill which is sometimes in cultivation and is owned by W. B. Ragsdale, a merchant of Jacksonville. Station is 70 meters (230 feet) north of an east-and-west wire fence and lane, and about 200 meters (656 feet) east of a lane with a poor road running north from the east-and-west lane. Reached from Jacksonville by proceeding along the road to Tyler for about $1\frac{1}{4}$ miles to top of long hill, then turning east up the second lane to east turning off the road. Follow this lane one-fourth mile, turn south and go one-half mile to lane leading east, then along this lane about 200 meters (656 feet) to point opposite station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 21.64 meters (71.00 feet) from station, in azimuth $97^{\circ}38'$. Azimuth of *Jacksonville city water tank*, distant 1.4 miles, is $18^{\circ}41'34''$. Elevation of station, 200.8 meters (659 feet).

Jacksonville Laplace (Cherokee County, C. L. Garner, 1919).—On the south side of the grounds of the Baptist University of Jacksonville, about 8 meters (26 feet) north of the center of Lamar Street, about 9 meters (30 feet) east of the road and walk leading from Lamar Street to the building, 56.50 meters (185.4 feet) from center of steps to building, and 3.0 meters (10 feet) north of drain gutter. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 13.86 meters (45.5 feet) from station, in azimuth $95^{\circ}49'$. The azimuth of the cupola of the university from the station is $163^{\circ}38'$. Surface mark disk is stamped "Jax Laplace." Elevation of station, 168.0 meters (551 feet).

Salem (Rusk County, C. L. Garner, 1919).—About 27 miles by road to eastward of Jacksonville, 19 miles southwest of Henderson, about $3\frac{1}{2}$ miles east of north from New Salem, 1 mile west of the New Salem-Henderson Road, one-half mile west of G. L. Simmon's house, on top of a prominent timbered hill locally known as Quinn Mountain, and on land belonging to Dr. H. C. Banette who lives at New Salem. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 34.71 meters (113.9 feet) from station in azimuth $38^{\circ}41'$. The azimuth of the school cupola at Reklaw is $350^{\circ}03'44''$. Elevation of station, 207.5 meters (681 feet).

Cushing (Nacogdoches County, C. L. Garner, 1919).—About 4 miles by road southeast of the town of Cushing, 2 miles to the northeast of the Cushing-Nacogdoches Road, on the northern extremity of a high and prominent ridge locally known as Flower Mountain. Station is on land owned by W. W. Goldberry, who lives at the foot of the hill, and about one-half mile to the east, and is also about one-half mile east of J. B. Johnson's house on the top of the mountain. It is about 25 meters (82 feet) from the sharp decline of the mountain to the north, 20 meters (66 feet) from the sharp decline to the west, in the north edge of newly cleared land, and about 100 meters (328 feet) east of the road leading northeast

from Johnson's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), in the south side of the field alongside a wire fence, and 91.33 meters (299.6 feet) from the station, in azimuth $46^{\circ}54'$. The azimuth of a white church at Cushing, distant 2 miles, is $136^{\circ}00'15''$. Elevation of station, 210.2 meters (690 feet).

Enterprise (Rusk County, C. L. Garner, 1919).—About 1 mile northwest of the town of Mount Enterprise, about one-fourth mile east of the Mount Enterprise-Henderson Road, on top of a prominent hill known locally as Mount Enterprise, on the southernmost rise of the mountain, in the edge of a cultivated field belonging to John Thompson, 32 meters (105 feet) from the edge of the woods to the south and the sharp decline of the hill, and 150 meters (492 feet) west of the east end of the field. A dim road leads to the top of the hill. Surface and underground marks are standard disk station marks in cement, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 34.93 meters (114.6 feet) from station, in azimuth $135^{\circ}41'$. Elevation of station, 220.1 meters (722 feet).

Appleby (Nacogdoches County, C. L. Garner, 1919).—About $3\frac{1}{4}$ miles by road east of Appleby, 150 meters (492 feet) south of the Appleby-Miller Mills road, on top of a hill, in edge of a cultivated field belonging to T. J. Greening and 200 meters (656 feet) east of his house. Station is about 4 meters (13 feet) south of wire fence separating property of Mr. Greening from that of Mr. Crawford. Surface and underground marks are standard disk station marks in cement, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed just inside the wire fence, and 25.71 meters (84.4 feet) from station, in azimuth $261^{\circ}07'$. Elevation of station, 184.2 meters (604 feet).

Timpson (Shelby County, C. L. Garner, 1919).—About 6 miles south of Timpson 4 miles north of Stockman, one-half mile west of the Timpson-Stockman road, on top of a prominent timbered hill known locally as "Big Mountain", also as "Bennett Mountain", and owned by T. A. Merry who lives on the above road about one-half mile east of the station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 20.17 meters (66.2 feet) from station, in azimuth $266^{\circ}16'$. Azimuth of *Timpson tank*, distant $\frac{1}{4}$ miles, is $177^{\circ}40'18''$. Elevation of station, 176.8 meters (580 feet).

Baker (Shelby County, C. L. Garner, 1919).—About 9 miles by road southeast of Timpson, $9\frac{1}{2}$ miles by road northwest from Center, on top of a prominent hill, the highest in the vicinity, $1\frac{1}{2}$ miles by road west of John E. Baker's house, and on land belonging to B. D. Turner. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 25.72 meters (84.4 feet) from station, in azimuth $7^{\circ}27'$. *Timpson tank* is distant $\frac{5}{8}$ miles in azimuth $147^{\circ}01'45''$. Elevation of station, 192.7 meters (632 feet).

Holt (Nacogdoches County, C. L. Garner, 1919; 1931).—About 3 miles south of Martinsville, 15 miles east of Nacogdoches, on top of a flat cultivated field belonging to Mr. Martin of Martinsville, about one-fourth mile north of house belonging to a Mr. Holt, and about 200 meters (656 feet) east of direct road from this house to Martinsville. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), placed in the south edge of the field alongside wire fence dividing field from woods, about 50 meters (164 feet) east of above-mentioned road, and 148.65 meters (487.7 feet) from the station, in azimuth $91^{\circ}45'38''$. The approximate azimuth of Holt's house, one-fourth mile distant, is 334° . Elevation of station, 173.3 meters (569 feet). In 1931 both station and reference marks were recovered.

Covington (Shelby County, C. L. Garner, 1919).—About 8 miles southwest of Center, one-fourth mile east of the Center-Grigsby-Nacogdoches road, on flat hill in cleared field owned by E. L. Covington, and about one-fourth mile from his house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark is standard reference disk in concrete, note 11 (a), 63.00 meters (206.7 feet) from the station, in azimuth $349^{\circ}07'$. The chimney of Mr. Covington's house is about one-fourth mile distant in azimuth $76^{\circ}21'$. Elevation of station, 169.6 meters (556 feet).

Neuville (Shelby County, C. L. Garner, 1919; 1931).—About 8 miles by road south of Shelbyville, $1\frac{1}{4}$ miles west of the Shelbyville-San Augustine road, in an old abandoned field, on top of a flat hill known locally as "Big Hill."

Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark (1919) is standard reference disk in concrete, note 11 (a), 36.94 meters (121.2 feet) from station, in azimuth $348^{\circ}32'$. Azimuth from station to steel water tank at Center is $145^{\circ}51'08''$. Elevation of surface mark in 1919 was 171.27 meters (561.9 feet). In 1930 the station and reference marks were recovered; the disk of the surface mark had been broken off, but stem remained. The disk of the reference mark had been battered. A new reference mark was set in 1931, similar to the old reference mark, and 35.46 meters (116.3 feet) from station in azimuth $71^{\circ}47'$. In 1930 station was reached by Highway No. 8 (Center to San Augustine), and proceeding to a point 7.1 miles south of Shelbyville, half-way up a long hill. A triangle was blazed on a pine tree to right (or north) of highway. A small white house is near the foot of the hill and on the left (or south) of highway. From this point an old road runs north through the woods; follow this road 0.4 mile, to point where roads run in all directions; follow the road to north along top of ridge for about 1 mile to a clearing. Station is in this clearing, about 25 feet south of road, 30 feet west of pine tree with 4 blazes in it standing about 8 feet south of road. Rotten lumber of old signal lay to east of station. Elevation of station, 171.3 meters (562 feet).

Doggett (Shelby County, C. L. Garner, 1919; 1931).—About 5 miles by road west of Logansport, La., 1 mile south of Joaquin, on top of a hill, in the edge of a cultivated field belonging to F. A. Doggett, about 300 meters (984 feet) west of his house, and 3 meters (10 feet) south of center line of rail fence to the north of which are woods. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark (1919) is a standard reference disk in concrete, note 11 (a), set in a corner of the fence on the side of field to west of station, 29.68 meters (97.4 feet) from station, in azimuth $89^{\circ}41'$. In 1931 the station was recovered in good condition, and a new reference mark, similar to the one placed in 1919, was established, 90.76 meters (297.8 feet) from station, in azimuth $342^{\circ}42'$. The azimuth of a steel water tank at Haslam is $243^{\circ}37'19''$. Elevation of station, 112.7 meters (370 feet).

Hunter (De Soto Parish, La., C. L. Garner, 1919; 1930).—About 15 miles southeast of Logansport, 15 miles southwest of Mansfield, $4\frac{1}{2}$ miles south of the Mansfield-Logansport road, 250 meters (820 feet) west of the Mansfield-Hunter road, on top of the highest hill in the vicinity. Hill is wooded and belongs to W. E. Sims who lives on the Mansfield-Hunter road about 300 meters (984 feet) south of point opposite station. In 1930 station was reached from Mansfield west on the Logansport highway 10.5 miles to point where there is a large white house on the north and a road to south is cut through bank. Follow this road 0.9 mile to forks; turn right and go 1 mile; take left fork and go 2.5 miles to house on west side of road; from house go through gate on south side of shed and bear west into cultivated field, then southwest along west edge of woods to gap in trees in a draw. Pass through gap and go to southeast corner of big trees, then bear right along south edge of trees to station on high ground in north edge of cotton field on south edge of woods. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). In 1930 surface mark was found loose and concrete broken off horizontally 3 inches from top; it was reset. Reference mark (1919) is a standard reference disk in concrete, note 11 (a), 46.06 meters (151.1 feet) from station, in azimuth $277^{\circ}57'$. In 1930 an additional reference mark was set, and called no. 1. It is a standard reference disk in concrete, note 11 (a), 25.06 meters (82.2 feet) from station, in azimuth $199^{\circ}39'$. Azimuth from station to *Mansfield, water tank*, distant 10.5 miles, is $229^{\circ}05'43''$. Elevation of station, 115.1 meters (378 feet).

Lula (De Soto Parish, La., C. L. Garner, 1919; 1930).—About 24 miles southeast of Logansport, 3 miles southwest of Lula post office, 2 miles west of the road leading south from Lula post office, on a prominent hill, the highest in the vicinity, known locally as "Big Hill," and owned by the Frost Johnson Lumber Co. Station is about 350 meters (1,148 feet) west of Mr. A. Smith's house, and 130 meters (427 feet) west of fence line between his farm and the lumber company's property. In 1930 it was reached from Mansfield along the Logansport-Mansfield highway 6 miles to a filling station at forks; thence along left fork 8.9 miles to dirt road leading to right. This dirt road passes between old unpainted church on left and Negro school on right. Follow this road 3.0 miles to house of A. W. Lewis on right of road; one-fourth mile beyond his house in a dim woods road which goes south one-fourth mile to top of hill and station. Road is marked with triangle blazed on pine tree. At top of hill is a triangle blazed on pine tree which

is just north of very large oak tree. Station is about 30 meters (98 feet) west of this tree. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference mark (1919) is standard reference disk in concrete, note 11 (a), 70.02 meters (229.7 feet) from station, in azimuth $295^{\circ}40'$. In 1930 an additional reference mark was set, and called no. 1. It is a standard reference disk in concrete, note 11 (a), 35.20 meters (115.5 feet) from station, in azimuth $216^{\circ}37'$. Elevation of station, 108.4 meters (356 feet).

Supplementary points

Tehuacana latitude and longitude station (Limestone County, W. B. Fairfield, 1919).—Distant 5.11 meters (16.8 feet) south and 0.54 meter (1.8 feet) west from station *Tehuacana* (see description thereof). Marked by a concrete pier.

Jacksonville latitude and longitude station (Cherokee County, J. E. McGrath, 1919).—In the grounds of the Baptist College, near the Lamar Street line of the college property, a little east of the roadway extending across the campus and in front of the college building, and 9.44 meters (31.0 feet) due north of station *Jacksonville Laplace* (see description thereof). Marked by a temporary wooden pier.

NINETY-FOURTH MERIDIAN ARC

Principal points

Foreman (Little River County, Ark., P. A. Smith, 1930).—About 5 miles by road east of Foreman and $13\frac{1}{4}$ miles west of Ashdown, on Highway No. 32, in a small triangular plot of ground owned by J. A. Wickliss, and on the west side of NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 5, T. 13 S., R. 31 W. Station is about one-fourth mile west of house on Wickliss farm, a large unpainted house with outside chimney on west, situated on north side of highway, and is 12.9 meters (42 feet) north of highway, 9.3 meters (31 feet) east of woods road to north, and 5.7 meters (19 feet) southwest of wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line south of highway, about 30 meters (98 feet) east of barn on south side of road, and approximately one-fourth mile from station in azimuth $288^{\circ}54'12''$; no. 2 is 18 meters (59 feet) south of highway, 4 meters (13 feet) west of section road to south, and 31.37 meters (102.9 feet) from station in azimuth $19^{\circ}47'$.

Hawkins (Little River County, Ark., P. A. Smith, 1930).—About $3\frac{1}{4}$ miles by road west of Ashdown, on Highway No. 32, on land owned by Hawkins brothers, along the center of the southside of N $\frac{1}{2}$ sec. 2, T. 13 S., R. 30 W. Station is 15.6 meters (51 feet) north of center line of highway 32, 8.1 meters (27 feet) north of wire fence, and 9.5 meters (31 feet) east of gate post of board gate on road to small unpainted house 50 meters (164 feet) to north. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is 18 inches below surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 8 meters (26 feet) south of an 18-inch oak tree where woods project into field from east, and is about 250 meters (820 feet) from station in azimuth $211^{\circ}15'05''$; no. 2 is $\frac{1}{2}$ meter ($1\frac{1}{2}$ feet) east of wire fence, 21 meters (69 feet) north of highway, and 30.83 meters (101.1 feet) from station in azimuth $102^{\circ}42'$.

Holland (Bowie County, P. A. Smith, 1930).—About $3\frac{1}{2}$ miles northwest of Texarkana, on land belonging to Matt Holland, colored. To reach from Texarkana, go west on Highway No. 5, 0.8 mile beyond Hannon's Tourist Camp, to stone gateway on left at end of street car line, thence north and northwest 2.5 miles to station, over city streets and Richmond road. Station is about 60 meters (197 feet) west by south of Richmond road, 40 meters (131 feet) north of dirt road leading to Holland's house, and 70 meters (230 feet) south by west of Texarkana Water Corporation substation, on top of a small rise of ground in a wood lot. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 19.25 meters (63.2 feet) from station in azimuth $153^{\circ}49'$; no. 2, 17.61 meters (57.8 feet), $81^{\circ}40'$.

Ashdown northwest base (Little River County, Ark., P. A. Smith, 1930; 1931).—In a cultivated field owned by Mrs. J. P. Erwin, 1.3 miles northwest of Ashdown railway crossing, on United States Highway No. 71, 17.1 meters (56 feet) west of highway, on northern prolongation of tangent of Kansas City Southern Railway, 60 meters (197 feet) west of tracks, and 7 meters (23 feet) west of east fence of field. Surface and underground marks are standard disk

station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 14.7 meters (48 feet) east of highway, 8 meters (26 feet) west of the railroad, and 31.78 meters (104.3 feet) from station in azimuth $247^{\circ}50'$; no. 2 is 30 meters (98 feet) west of highway, in an east-and-west fence line 4 meters (13 feet) west of fence corner, 35 meters (115 feet) south of southeast corner of house, and 200 meters (656 feet) from station in azimuth $338^{\circ}31'05''$.

Ashdown southeast base (Little River County, Ark., P. A. Smith, 1930; 1931).—About 8 miles southeast of Ashdown, 150 meters (492 feet) southeast of Ogden railway station on the Kansas City Southern Railway, 28.2 meters (93 feet) east of Highway No. 71, and 10 meters (33 feet) south from southerly of small pine trees in a draw east of the railway station. Station is on land owned by Roscoe Wood, and is marked underground and at surface by standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in edge of cultivated ground, 25.97 meters (85.2 feet) from station in azimuth $200^{\circ}41'$; no. 2 is about 28 meters (92 feet) east of highway, and about 28.27 meters (92.8 feet) from station in azimuth $333^{\circ}23'$. A standard disk in 6-inch concrete-filled pipe was set but not used as offset station. It is near line of east rail, and about opposite station.

Hooks (Bowie County, P. A. Smith, 1930).—About 15 miles west of Texarkana, 0.3 mile west and 1 mile south of Hooks railway station, on land belonging to Robert Guinn, 1.1 meters (4 feet) east of east road fence prolonged and 2.8 meters (9 feet) north of south road fence prolonged, where county road turns west 1 mile south of Highway No. 5. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is 18 inches below ground to avoid being disturbed by cultivation. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in east fence line of county road, about 3 meters (10 feet) south of wagon road leading southeast, and about 130 meters (427 feet) from station in azimuth $180^{\circ}55'21''$; no. 2 is one-half meter (2 feet) north of south fence along road, and 34.12 meters (111.9 feet) from station in azimuth $87^{\circ}28'$.

Alamo (Cass County, P. A. Smith, 1930; 1933).—About 12 miles, airline, south of Texarkana and 8.5 miles, airline, northeast of Queen City, on the highest point of what is locally known as Cripple Mountain, and on land supposed to belong to Merritt and Branden. It is about one-half mile southwest of the farm of G. Grundy. To reach from Queen City go north 2.3 miles on Highway No. 47, thence east 2.9 miles to point 0.4 mile beyond Springdale School, thence along right hand fork and main road east and north 1.2 miles to T-road intersection, turn east and keep straight ahead 0.9 mile, take left fork at 1.9 miles, right fork at 2.0 miles, and at 3.1 miles take left of 3 forks; 2 triangular blazes can be seen on left at this fork. From here the station is reached over dim wagon roads, through woods, and a good description is not possible. Station is about 1 mile north of the 3 forks, and the road is west of the top of the ridge. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). One is on side of knoll, 30.20 meters (99.1 feet) (slope distance) from station in azimuth $75^{\circ}37'$; other is 10 meters (33 feet) west of a faint wagon road, and is about 150 meters (492 feet) from station in azimuth $347^{\circ}13'18''$.

Antioch (Cass County, P. A. Smith, 1930).—About 7 miles, airline, west-northwest of Queen City, and one-eighth mile northeast of Antioch School and Church, on west end of an east-and-west knoll in a cultivated field, on land owned by Witt Griffin, and under title as Joe Siah Massey Headright, about 110 meters (361 feet) east of county road, 9.4 meters (30.8 feet) east by south of southeast fence corner of orchard, and 2.1 meters (7 feet) south of south orchard fence prolonged. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Top of upper mark is 18 inches below surface, so placed because of cultivation of field. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line south of field, 10 meters (33 feet) west of northwest corner of Antioch Cemetery, and one-eighth mile from station in azimuth $37^{\circ}46'59''$; no. 2 is in south fence line of orchard, and 30.55 meters (100.2 feet) from station in azimuth $100^{\circ}36'$.

Bloomburg (Cass County, P. A. Smith, 1930).—About 10 miles east of Atlanta, 1.1 miles, airline, northeast of the town of Bloomburg, in a sandy, cultivated field owned by W. E. Robinson, and about 150 meters (492 feet) south by east of his house. To reach from Bloomburg go northeast 0.5 mile to where road turns east, thence north on dim road to T-intersection, and there take right-hand fork

0.3 mile to Robinson's house. Station is about 50 meters (164 feet) east of road leading to house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is 1 foot below surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 3 meters (10 feet) east of road to house, and 53.38 meters (175.1 feet) from station in azimuth $63^{\circ}01'$; no. 2 about 30 meters (98 feet) south of house, 4 meters (13 feet) south of well, and 131.2 meters (430 feet) from station in azimuth $169^{\circ}25'38''$.

Bivins (Cass County, P. A. Smith, 1930).—About 8 miles southwest of Atlanta and $1\frac{1}{4}$ miles northwest of Bivins, on land owned by T. N. Heath, and on the eastern end of a sandy knoll about one-fourth mile northwest of Heath's house. To reach from Bivins go west 0.4 mile from crossroad west of railroad tracks, thence to right on dim road about one-half mile to Heath's house. Station is in fence line between property of T. N. and A. Heath. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line, on east brow of hill, and 22.73 meters (74.6 feet) from station in azimuth $270^{\circ}02'$; no. 2 is 5 meters (16 feet) south of gate about middle of east side of field, and one-eighth mile from station in azimuth $330^{\circ}18'$.

Pinkard (Cass County, P. A. Smith, 1930; 1933).—About 9 miles, airline, south by east of Atlanta, $4\frac{1}{2}$ miles southeast by east of Bivins, and 1 mile south of Huffines School, on the northern end of a high, bare knoll about one-eighth mile northwest of Pinkard's house. Land is now owned by S. C. Pinkard, with probable change of ownership to R. S. Allday's Supply Co. Station is $8\frac{1}{2}$ meters (28 feet) south of edge of cultivated ground, and $13\frac{1}{2}$ meters (44 feet) east of cultivated ground to west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in a north-and-south fence line, 15 meters (49 feet) west of road and west of large pine tree west of road, and about one-fourth mile from station, in azimuth $177^{\circ}22'38''$; no. 2 is 475.1 feet from station in azimuth $268^{\circ}50'06''$.

Ravana (Miller County, Ark., P. A. Smith, 1930).—About one-half mile east of Ravana railroad station, on south end of bare knoll, on land owned by G. S. Beck, about 75 meters (246 feet) south of his house, 16.7 meters (55 feet) southeast of southeast corner of barn, 7.4 meters (24 feet) west of fence west of road, and 28.0 meters (92 feet) north of fence north of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is 4 inches below surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is $1\frac{1}{2}$ meters (5 feet) west of fence line, and 29.66 meters (97.3 feet) from station in azimuth $208^{\circ}09'$; no. 2 is in southwest corner of field, 10 meters (33 feet) north of road, and three-eighths mile from station in azimuth $84^{\circ}53'14''$.

Posey (Cass County, P. A. Smith, 1930).—About 6 miles, airline, northwest of Vivian, La., 4 miles southwest of Rodessa, La., 0.6 mile west of the Texas-Louisiana boundary, and on the highest point of a small wooded ridge. Reached from Vivian by going north along Highway No. 47 for 4.9 miles to county road running west at filling station, thence west on this road 3.6 miles to point 130 meters (427 feet) beyond a fork, to station site. Station is 12.5 meters (41 feet) north of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a), upper mark flush with surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line 5 meters (16 feet) south of road at fork, and 130 meters (427 feet) from station in azimuth $278^{\circ}12'41''$; no. 2 is 5 meters (16 feet) south of road, and 32.13 meters (105.4 feet) from station in azimuth $45^{\circ}58'$.

Spearman (Caddo Parish, La., P. A. Smith, 1930).—About 10 miles northeast of Vivian, $3\frac{1}{2}$ miles, airline, northeast of Rodessa, $3\frac{1}{2}$ miles west of Ida, and one-half mile south of the Louisiana-Arkansas boundary, in the middle of the south side of sec. 6, T. 23 N., R. 15 W., on land belonging to N. S. Spearman, 17.0 meters (56 feet) northeast of northwest corner of house, and 13.6 meters (45 feet) southeast of well. To reach from Rodessa go northeast 2.3 miles on the Ida road, thence north and east on county road 1.8 miles to house on Spearman farm, situated about 150 yards north of road on grassy knoll. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at east side of small field, at edge of timber, and 100 meters (328 feet) from station

in azimuth $228^{\circ}51'48''$; no. 2 is 20 meters (66 feet) west of well, and 34.48 meters (113.1 feet) from station in azimuth $111^{\circ}08'$.

Myra (Caddo Parish, La., P. A. Smith, 1930).—About 7 miles, airline, northeast of Vivian, and $1\frac{1}{4}$ miles southwest of Myra, on a high wooded ridge near the west boundary of land belonging to Dr. Collins, apparently near the middle of the west side of sec. 2, T. 22 N., R. 15 W., about 150 yards east of a cultivated field, near east end of ridge, and 6 meters (20 feet) north of a small pit. To reach from Myra go west on Myrtis road 0.9 mile from railroad, thence left at cross roads 0.5 mile to a steep woods road to left and opposite small house and barn. Follow woods road along west and south sides of cultivated field, thence southeast across another cultivated field to top of ridge, three-fourths mile in all. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete note 11 (a). No. 1 is 3 meters (10 feet) northeast of faint woods road, and about 60 meters (197 feet) from station in azimuth $157^{\circ}48'$; no. 2 is at east end of ridge, and 30.88 meters (101.3 feet) from station in azimuth $256^{\circ}32'$.

Vivian (Caddo Parish, La., P. A. Smith, 1930).—Two miles north of Vivian, one-fourth mile west of Highway No. 8, at northwest corner of small clearing and on northeast end of the highest knoll in the vicinity, about 50 meters (164 feet) west of fork in woods road, 11.6 meters (38 feet) south of road leading west, 37 meters (121 feet) west of road leading south and 20.3 meters (67 feet) west by south of a $2\frac{1}{2}$ -foot pin oak tree. Approximate location from map is in sec. 6, T. 22 N., R. 16 W. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 meter (3 feet) south of wire fence, at northwest corner of land owned by Mr. Bussa, and 37.29 meters (122.3 feet) from station in azimuth $206^{\circ}29'$; no. 2 is alongside east edge of clearing, 3 meters (10 feet) east of old road, about 30 meters (98 feet) from south end of clearing, and 90 meters (295 feet) from station in azimuth $332^{\circ}52'$.

Tyson (Caddo Parish, La., P. A. Smith, 1930).—About 7 miles, airline, southeast of Vivian, $2\frac{1}{2}$ miles west-southwest of Gilliam, one-fourth mile south of the Gilliam-Vivian road, on the high ground of the Tyson lease of the Gulf Refining Co., approximately in the center of sec. 14, T. 21 N., R. 15 W., 23.2 meters (76 feet) southeast of Tyson Well No. 12, about 50 meters (164 feet) south of highest point on ridge, and about 100 meters (328 feet) south of Dixie Oil Co.'s power station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 12 meters (39 feet) southwest of pump house at Well No. 12, and 36.92 meters (121.1 feet) from station in azimuth $56^{\circ}33'$; no. 2 is near a mail box, 5 meters (16 feet) southeast of a pump line running northwest from power station, 4 meters (13 feet) northwest of road, and one-eighth mile from station in azimuth $173^{\circ}28'$.

Lewis (Caddo Parish, La., P. A. Smith, 1930).—About 4 miles south of the town of Vivian, 1 mile northwest of Lewis railroad station, about 1 mile west of junction of State route nos. 8 and 202, 11.8 meters (39 feet) north of center line of pavement of route no. 202, and 17.87 meters (58.6 feet) east of no. 30 Caddo Parish right-of-way stake, a $2\frac{1}{2}$ -inch pipe. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on south side of highway, 35.06 meters (115.0 feet) from station in azimuth $308^{\circ}36'$; no. 2 is 25.7 meters (84 feet) southeast of no. 49 Caddo Parish right-of-way stake, 10.0 meters (33 feet) south of center line of highway, and about 250 meters (820 feet) from station in azimuth $86^{\circ}30'13''$.

Oil (Caddo Parish, La., P. A. Smith, 1930).—Station is 0.7 mile west of Oil City, on the Ferry Lake road, about 40 meters (131 feet) southwest of the 84-foot wooden oil derrick of the Gulf Refining Co., which stands on the north side of the road, approximately on line between secs. 11 and 12, T. 20 N., R. 16 W., 19.3 meters (63 feet) south of center line of pavement, and 33.9 meters (111 feet) northeast of tree at west end of gate on road leading through fence to south. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at a fence corner, 125 meters (410 feet) west of D. E. Chandler's house, 7 meters (23 feet) north of pavement, south of a galvanized iron barn, and one-fourth mile from station, in azimuth $103^{\circ}59'30''$; no. 2 is 19.2 meters (63 feet) north of paved road, one-half meter (2 feet) east of wire fence, and 36.55 meters (119.9 feet) from station in azimuth $181^{\circ}43'$.

Belcher (Caddo Parish, La., P. A. Smith, 1930).—One-half mile south of Belcher, on Highway No. 71, 0.1 mile south of railroad crossing at point where private road leads to southwest along southeast edge of a cultivated field, 16.9 meters (55 feet) west of center of pavement, and 13.4 meters (44 feet) north by west of private road, on land belonging to Dr. Tooke. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a), the surface mark projecting 1 foot above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 9 meters (30 feet) west of center of pavement, and 39.06 meters (128.1 feet) from station in azimuth $191^{\circ}57'$; no. 2 is 3 meters (10 feet) northeast of brick chimney of Negro cottage with tree growing in front, and about one-third mile from station in azimuth $47^{\circ}49'15''$.

Moor (Caddo Parish, La., P. A. Smith, 1930).—Station is 3.8 miles south-southeast of Mooringsport, on Greenwood road, about 130 meters (427 feet) northwest of road intersection, where a wagon road forks to left and a graded road leads west, on State-owned land which has been cleared of standing timber, on east side of sec. 15, T. 19 N., R. 16 W., 42.7 meters (140 feet) west of Greenwood road, and 118.8 meters (390 feet) north of graded road leading west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 11.4 meters (37 feet) west of road, and 31.33 meters (102.8 feet) from station in azimuth $280^{\circ}52'$; no. 2 is 8 meters (26 feet) west of road, and about 450 meters (1,476 feet) from station in azimuth $357^{\circ}45'17''$.

Roy (Caddo Parish, La., P. A. Smith, 1930).—About 8 miles, airline, northwest of Shreveport, 2 miles east of Blanchard, on a high, sandy, flat-topped ridge, heavily wooded, on land owned by R. O. Roy, approximately in the south side of sec. 36, T. 19 N., R. 15 W. To reach from junction of route nos. 8 and 71, 3 miles north of Shreveport, go north on route no. 8 about 6.5 miles to a fence corner about one-fourth mile north of gravel road leading to left and 150 meters (492 feet) south of a filling station on route no. 8; south of fence turn west and go about 200 meters (656 feet) to gate, through gate and south up gradual slope to woods, and along dim road through woods to east and south until top of ridge is reached, thence west several hundred meters to line where gas line which ran in a northeasterly and southwesterly direction has been removed. Station is about 50 meters (164 feet) northeast of highest point on knoll, 10.8 meters (35 feet) north of blazed pine tree 1 foot in diameter, and in clearing left by gas line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 20.78 meters (68.2 feet) from station in azimuth $53^{\circ}02'$; no. 2 is in clearing left by gas line, and is 31.63 meters (103.8 feet) from station in azimuth $133^{\circ}15'$.

Bryson (Caddo Parish, La., P. A. Smith, 1930).—Six miles west-southwest of Blanchard, 0.1 mile north of the intersection of the Greenwood-Mooringsport road and the Blanchard-Furrrh road, in the lot in front of Mr. Bryson's house, the first house on the east side of the road north of the intersection, on south side of sec. 11, T. 18 N., R. 16 W., 45.0 meters (148 feet) east of road, 33.1 meters (109 feet) west by north of northwest corner of house, and 16.5 meters (54 feet) south of wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at highway intersection, 12 meters (39 feet) east of Greenwood road, 35 meters (115 feet) southeast of a $2\frac{1}{2}$ -foot red oak tree, and 0.1 mile from station in azimuth $7^{\circ}24'14''$; no. 2 is about 15 meters (49 feet) east of road, 10 meters (33 feet) north by east of large red oak tree, and 32.92 meters (108.0 feet) from station in azimuth $118^{\circ}54'$.

Greenwood (Caddo Parish, La., P. A. Smith, 1930).—Station is 1.4 miles east of Greenwood, 0.2 mile south of gateway with stone posts on south side of Highway No. 80, on land owned by Mark Meyers, on north brow of ridge, about 2 meters (7 feet) east of west road fence line prolonged, 20.5 meters (67 feet) north by east of the northeast corner of a long chicken house, and 35.5 meters (116 feet) west by north of northwest corner of chicken house south of orchard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in east fence line of private road, 1.1 meters (4 feet) south of easterly stone gate post, about 20 meters (66 feet) south of highway, and 0.2 mile from station in azimuth $183^{\circ}53'03''$; no. 2 is at northwest corner of chicken house south of orchard, and 35.46 meters (116.3 feet) from station in azimuth $282^{\circ}40'$.

Reid (Caddo Parish, La., P. A. Smith, 1930).—On Highway No. 80, 2 miles west of its junction with Highway No. 171, in southwest part of Shreveport, 0.6 mile west of entrance to State Fair Grounds, on top of a knoll, on highest land in vicinity, and about 150 meters (492 feet) south of Highway No. 80, on land owned by G. D. Reid. Reid's place may be recognized by the wooden gate at head of small cut on driveway. Station is about 60 meters (197 feet) south by east of house, 9.7 meters (32 feet) west of cedar tree, the middle one of three in a row, 7.9 meters (26 feet) north of wire fence along north side of small cultivated field, and about 20 meters (66 feet) west of an old well. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 10 meters (33 feet) south of highway, one-half meter (2 feet) south of fence, 27 meters (89 feet) east of driveway, and 150 meters (492 feet) from station, in azimuth $181^{\circ}38'01''$; no. 2 is in northeast corner of small field, and 34.00 meters (111.5 feet) from station, in azimuth $279^{\circ}56'$.

Spring (Caddo Parish, La., P. A. Smith, 1930).—Near the east edge of sec. 2, T. 15 N., R. 6 W., about 1.5 miles west-northwest of the town of Springridge, about 200 meters (656 feet) west of an old road, which probably marks the line between secs. 1 and 2, but about which line no definite information was obtained. Station is about 50 meters (164 feet) west of a small pine grove, 13.65 meters (44.8 feet) northwest of the center of a 10-inch oil well casing (capped), and 38.5 meters (126 feet) northwest of a pit about 25 feet square which lies south of the oil well. To reach station from Springridge store, go west 1.3 miles to a road leading off to right (north) to two tenant houses about one-fourth mile north of main road; turn east between the two houses, and follow the winding woods road about one-half mile to old oil well and station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on high ground east of station, in west fence line of a north-and-south road, 14.5 meters (48 feet) north of a 14-inch dead walnut tree and about 250 meters (820 feet) from station in azimuth $227^{\circ}30'17''$; no. 2 is on the south edge of field, 0.1 meter (0.3 foot) north of east-and-west fence, and about 100 meters (328 feet) from station in azimuth $355^{\circ}51'32''$.

Shreveport north base (Caddo Parish, La., P. A. Smith, 1930).—About $7\frac{1}{2}$ miles, airline, south by west of the courthouse in Shreveport, in southeast corner of pasture on land belonging to T. B. Howell, 20.8 meters (68 feet) west of west rail of the Texas & Pacific Railway, 6.6 meters (22 feet) northwest of the southeast corner post of pasture, and about 50 meters (164 feet) north of switch for a railway siding. To reach from Shreveport go to intersection of Highways Nos. 80 and 171, thence south 6.1 miles on Highway No. 171 to two white houses on east side of road; turn in at Mr. Howell's house which is the southern one of the two, pass south of the house through a gate, follow wagon tracks about east by north across pasture about one-fourth mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in the northeast corner of pasture, 15.2 meters (50 feet) south of a 30-inch oak, 14.45 meters (47.4 feet) west of west rail of railroad, 29.0 meters (95 feet) northeast of a 20-inch pin oak, and 165.7 meters (544 feet) from station in azimuth $208^{\circ}34'56''$; no. 2 is about 1 foot north of the south fence line of pasture, and 27.85 meters (91.4 feet) from station in azimuth $80^{\circ}12'$.

Shreveport south base (Caddo Parish, La., P. A. Smith, 1930).—About 16 miles by road south of Shreveport and 1 mile south by west of Keithville, on land belonging to A. B. Clingman, 39.0 meters (128 feet) southeast of the southeast corner of house on Clingman's land, 29.3 meters (96 feet) west by north of Southern Pacific Co.'s tracks at beginning of curve a few feet south of sign "1 mile to Keithville", 10.8 meters (35 feet) west by north of road, and 11.4 meters (37 feet) west by south of pine tree alongside of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of garden fence, about 20 meters (66 feet) south of house, and 37.60 meters (123.4 feet) from station in azimuth $128^{\circ}47'$; no. 2 is 9 meters (30 feet) west of road, 30 meters (98 feet) north of railroad crossing, and about 0.2 mile from station in azimuth $27^{\circ}47'53''$.

Stonewall (De Soto Parish, La., P. A. Smith, 1930; 1933).—About 14 miles, airline, south of Shreveport, $2\frac{1}{2}$ miles northeast of Stonewall, and $3\frac{1}{2}$ miles south-east of Keithville, on the west end of a sandy, cultivated hill, on land belonging to

C. O. McMullin, 80 meters (262 feet) east of road at top of hill. To reach from Stonewall go east on gravel road 1.6 miles to fork, thence north one-half mile, east one-eighth mile, north one-half mile, and east one-fourth mile to gate to McMullin's house on north side of road; from gate go north past house and farm buildings and follow farm road north to top of hill and along west side of cultivated field about one-third mile. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is 1 foot below surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is alongside west edge of field, 4 meters (13 feet) southeast of wagon road where it descends to northeast through a small cut, and 252.2 feet from station in azimuth $122^{\circ}16'$; no. 2 is alongside north edge of field, about 6 meters (20 feet) southeast of three small pines in center of clump of brush, and approximately 287½ feet from station in azimuth $195^{\circ}35'$.

Forks (Caddo Parish, La., P. A. Smith, 1930).—About 6 miles, airline, southwest of Springridge, 6 miles, airline, west-northwest of Keachie, 0.2 mile north of Four Forks, and 50 meters (164 feet) west of center line of highway, in east edge of pecan grove belonging to Mrs. Stephen A. Brown. Station reached from Keachie by following the Marshall road west and north 6 miles to Four Forks, thence north on gravel road 0.2 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a); upper mark is 10 inches below surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 10 meters (33 feet) east of highway, 1 foot south of fence corner about 100 meters (328 feet) west of negro house, and about 250 meters (820 feet) from station in azimuth $182^{\circ}41'27''$; no. 2 is in fence line 10 meters (33 feet) east of highway, and 36.1 meters (118 feet) from station in azimuth $313^{\circ}52'$.

Kickapoo (De Soto Parish, La., P. A. Smith, 1930).—About 1 mile west of Gloster, 7 miles north of Grand Cane, 3½ miles east of Keachie, and about 250 meters (820 feet) north of the intersection of Highways Nos. 38 and 171, in small piece of grassland between highway and first house on west, 15.6 meters (51 feet) west of Highway No. 171, 33.0 meters (108 feet) south of northerly private road leading to farm house, and 13.2 meters (43 feet) north of private road along south side of grass plot. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at fence corner, 4 meters (13 feet) north of private road, 9 meters (30 feet) west of highway, and 37.82 meters (124.1 feet) from station in azimuth $189^{\circ}45'$; no. 2 is in fence line, 8 meters (26 feet) north of Highway No. 38, about 150 meters (492 feet) west of intersection of highways, and one-eighth mile from station in azimuth $34^{\circ}27'05''$.

Pace (De Soto Parish, La., P. A. Smith, 1930).—About 3¼ miles, airline, southwest by west of Longstreet, about 7 miles airline north of Logansport, in the SE¼ SE¼ sec. 28, T. 13 N., R. 16 W., in pasture, on land owned by J. O. Pace, about 45 meters (148 feet) southeast of corner of wire fence between cotton field and pasture, and about 125 meters (410 feet) west of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 7 meters (23 feet) west of center line of road, 10 meters (33 feet) south of south side of gate, 2 meters (7 feet) northwest of a 4-foot stump, 40 meters (131 feet) south of a negro house, and 150 meters (492 feet) from station in azimuth $303^{\circ}12'15''$; no. 2 is on center line of wire fence between cotton field and pasture, about 36 meters (118 feet) northeast of corner of same wire fence, and 66.80 meters (219.2 feet) from station in azimuth $162^{\circ}55'$.

Ford (De Soto Parish, La., P. A. Smith, 1930).—About 1¼ miles, airline west-southwest of Grand Cane, on land owned by Mr. Ford, on a slight knoll, 26.2 meters (86 feet) northeast of a 30-inch pine tree, and 53.4 meters (175 feet) south of southeast corner of negro house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of northeast corner of a four-room negro house, 5 meters (16 feet) east of east side of brick chimney on north side of house, and 150 meters (492 feet) from station in azimuth $63^{\circ}45'28''$; no. 2 is 5 meters (16 feet) south of small chicken house, 17.8 meters (58 feet) southeast of southeast corner of negro house, and 37.20 meters (122.0 feet) from station in azimuth $171^{\circ}55'$.

Brittain (Shelby County, P. A. Smith, 1931).—One-half mile south of Camp Brittain, a logging camp of the Pickering Lumber Co., about one-fourth mile northeast of the Brittain consolidated schoolhouse, about 4 miles northwest of

East Hamilton, on land belonging to the Pickering Lumber Co. The road forks just beyond the schoolhouse; take left hand fork and go 0.1 mile to abandoned church, and there turn right and go about 130 meters (427 feet) to station on highest ground. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in oak brush, 31.39 meters (103.0 feet) from station in azimuth $152^{\circ}37'$; no. 2 is at northeast corner of old abandoned church, about 8 meters (26 feet) west of road, and about 140 meters (459 feet) from station in azimuth $79^{\circ}16'$.

Molly (San Augustine County, P. A. Smith, 1931).—About 4 miles, airline, northeast of San Augustine, in a plowed field belonging to Mrs. Molly Mackechney about 6 meters (20 feet) north of corner of wire fence, about 55 meters (180 feet) west of dim road leading north on east side of Mackechney land, and about 75 meters (246 feet) north and west of owner's house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark placed 1 foot below surface to avoid damage by plow. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north edge of cotton field, in east-and-west fence line, about 60 meters (197 feet) west of northeast corner of field, and about 400 meters (1,312 feet) from station in azimuth $182^{\circ}39'48''$; no. 2, 4 meters (13 feet) west of center line of road, at corner of wire fence, and 49.96 meters (163.9 feet) from station in azimuth $268^{\circ}58'$. Later in 1931 reported that station marks had been removed, but that reference marks were still intact.

Geneva (Sabine County, P. A. Smith, 1931).—One mile north of Geneva, a town on Highway No. 21, about 100 meters (328 feet) west of the Geneva-Saron Road, on the high point of a high wooded hill, 4.9 meters (16 feet) southeast of 18-inch oak tree with triangular blaze, on land belonging to J. E. Minton, of Hemphill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in woods, 26.53 meters (87.0 feet) from station in azimuth $334^{\circ}15'$; no. 2 is about 3 meters (10 feet) east of old road through woods leading to station, and 55 meters (180 feet) from station in azimuth $227^{\circ}41'$.

Bronson (Sabine County, P. A. Smith, 1931; 1933).—One-half mile northeast of the town of Bronson, on land owned by O. McDaniels, in a small woods north of his house, about 40 feet east and 150 feet north of house, about 100 meters (328 feet) north of Texas Forest Service tower, and about 110 meters (361 feet) west of State Highway No. 8. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in small clearing, and 26.80 meters (87.9 feet) from station in azimuth $254^{\circ}33'$; no. 2 is 60 meters (197 feet) west of center line of Highway No. 8, 70 meters (230 feet) south of Texas Forest Service lookout station in top of tall pine, and 150 meters (492 feet) from station in azimuth $358^{\circ}50'37''$.

Bannister (San Augustine County, P. A. Smith, 1931).—Six miles southwest of Macune, about 6 miles north of Broaddus, on a ridge just northeast of a board corral, about 22 meters (72 feet) east of Highway No. 147, on land belonging to the Long Bell Lumber Co. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). One is about 9 meters (30 feet) west of highway, in a clearing, and 150 meters (492 feet) from station in azimuth 47° ; Other is about 8 meters (26 feet) west of center line of highway, and 31.70 meters (104.0 feet) from station in azimuth $126^{\circ}34'$.

Rosin (San Augustine County, P. A. Smith, 1931).—Station is 4.4 miles by road west of Brookeland, a town on Highway No. 8, 150 meters (492 feet) north of the Brookeland-Veach Road, on a sharp untimbered sand hill. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 3 meters (10 feet) west of center of old wagon road, and 200 meters (656 feet) from station in azimuth $354^{\circ}37'35''$; no. 2 is 10 meters (33 feet) east of center of Brookeland-Veach Road, and 64.78 meters (212.5 feet) from station in azimuth $306^{\circ}26'$.

Mott (Angelina County, P. A. Smith, 1931).—About 8 miles east of Zavalla, 300 meters (984 feet) north of Highway No. 63, one-half mile east of J. S. Mott's house, on land belonging to the Kirby Lumber Co. Reached from Zavalla by going east along Highway No. 63 a distance of 7.5 miles, to point 0.6 mile beyond Mott's house which is on right of road, thence north along old logging road for

200 meters (656 feet). Station is on highest ground west of logging road, on end of small ridge running out to west, about 137 meters (449 feet) west of road and 93 meters (305 feet) west of a tall, virgin pine tree. Timber is logged from land. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 2 meters (7 feet) northwest of logging road, 1 meter (3 feet) south of stump of 3-foot tree, and 135.95 meters (446.0 feet) from station in azimuth $312^{\circ}49'03''$; no. 2 is 2 meters (7 feet) west of logging road, about 50 meters (164 feet) north of clump of trees, and about 160 meters (525 feet) from station in azimuth $3^{\circ}19'47''$.

Graham (Jasper County, P. A. Smith, 1931).—About 7 miles, airline, northwest of the town of Jasper, among scattered trees on highest point of ground in pasture belonging to W. R. Graham, about 200 meters (656 feet) southwest of his house, about 140 meters (459 feet) south of a board fence and road along north side of pasture, and about 50 meters (164 feet) east of wire fence and road along west side of pasture. To reach from Jasper go west along Highway No. 63 for 3.3 miles, then turn north on a graded road opposite Jolley's store and filling station, and follow main road for 4.3 miles to a stream bed; 0.3 mile beyond stream bed keep right-hand road at fork, and continue 1.8 miles beyond fork to Graham's house on north side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line on north side of pasture, 2 meters (7 feet) east of board gate opening into pasture, 5 meters (16 feet) south of traveled road, and 140 meters (459 feet) from station in azimuth $196^{\circ}28'$; no. 2 is in line of wire fence on west side of pasture, and 49.84 meters (163.5 feet) from station in azimuth $88^{\circ}12'$.

Gregory (Tyler County, P. A. Smith, 1931).—About $6\frac{1}{4}$ miles, airline, northeast of Colmesneil, $\frac{4}{4}$ miles southeast of Rockland, 0.2 mile northeast of Gregory Cemetery, and one-third mile southwest of Neiland Spring, on a sandy logged-off knoll, the highest point in the vicinity. Reached from Colmesneil by going north on Highway No. 40 for $3\frac{1}{4}$ miles, thence east on county road south of railroad for 3.9 miles to fork at blazed tree, thence along left fork north 0.7 mile to crossroad and station. Station is 13.0 meters (43 feet) south of a hickory tree used as a forestry lookout, 72 meters (236 feet) west of road to north, and 45 meters (148 feet) north of road to west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 2 meters (7 feet) west of road, and 70.78 meters (232.2 feet) from station, in azimuth $313^{\circ}10'$; no. 2, 0.2 meter (0.7 foot) west of road, and 130 meters (427 feet) from station, in azimuth $49^{\circ}00'06''$.

Town (Tyler County, P. A. Smith, 1931).—Station is 4.5 miles by road west of Town Bluff, 10.2 miles by road east of Woodville, about 27 meters (89 feet) north of the Town Bluff-Woodville Road, on the north boundary of W. F. Griffith's farm, and directly north of his house which is on the south side of the road. Station is in a small unfenced plot of ground, 7.5 meters (25 feet) west of a picket fence, about 12 meters (39 feet) southwest of corner of same fence, and about 19 meters (62 feet) east of woven wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is about 11 meters (36 feet) south of center line of road, 1 foot south of woven wire fence on opposite side of road from small negro house with board fence around it, and 100 meters (328 feet) from station, in azimuth $280^{\circ}17'12''$; no. 2 is on south side of road, 5 meters south of center line of road, 1 foot south of a woven wire fence, and 53.48 meters (175.5 feet) from station, in azimuth $46^{\circ}45'$.

Woodville (Tyler County, P. A. Smith, 1931).—Station is 1.8 miles east of Woodville, on the Woodville-Town Bluff Road, at top of first ridge east of town, on wooded land belonging to Mrs. A. Barclay, about 50 meters (164 feet) east of Watson's house, a white house on north side of road, 15.0 meters (49 feet) north of highway, and 7.5 meters (25 feet) east of fence along east side of Watson's garden. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 7 meters (23 feet) south of highway, 3 meters (10 feet) east of wood road leading to southeast, and 49.76 meters (163.3 feet) from station, in azimuth $320^{\circ}18'$; no. 2 is in fence line north of highway, about 25 meters (82 feet) southwest of small unpainted house, and about 200 meters (656 feet) from station, in azimuth $113^{\circ}36'11''$.

Hillister eccentric (Tyler County, P. A. Smith, 1931).—An unmarked point 17.966 meters (58.94 feet) in azimuth $268^{\circ}44'$ from station *Hillister* (see description thereof).

Spurger (Tyler County, P. A. Smith, 1931).—About $2\frac{1}{4}$ miles, airline, west by south of the village of Spurger, 10.3 miles by road east of Hillister, about 0.3 mile east of Mr. Bingham's house which stands on the north side of the road, about 350 meters (1,148 feet) east of bridge with an iron railing, about 12 meters (39 feet) south of center line of road and in pine woods, on land belonging to the Kirby Lumber Co., and about 10 meters (33 feet) east of three triangular blazed trees, nearest road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is about 5 meters (16 feet) northeast of center line of road, about 10 meters (33 feet) east of wood road leading north, and 52.61 meters (172.6 feet) from station, in azimuth $236^{\circ}15'$; no. 2 is about 5 meters (16 feet) north of center line of road, and about 100 meters (328 feet) from station, in azimuth $86^{\circ}45'05''$.

Swearingen (Tyler County, P. A. Smith, 1931).—About $7\frac{1}{4}$ miles, airline, or 8.6 miles by road east by south from Warren, on land belonging to C. C. Swearingen, whose house is on south side of road, with barn on north side, about 50 meters (164 feet) east of house. Station is about 100 meters (328 feet) north of barn, 16 meters (52 feet) east of a wire-and-board fence, and about 9 meters (30 feet) west of a dim road, in high pines. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in clearing, about 26 meters (85 feet) east of dim road, and 35.97 meters (118.0 feet) from station, in azimuth $265^{\circ}18'$; no. 2 is on north side of road, about 40 meters (131 feet) north of house, 6 meters (20 feet) north of center line of road, 1 foot north of east-and-west woven-wire fence, and 150 meters (492 feet) from station, in azimuth $34^{\circ}16'34''$.

Village Mills north (Tyler County, P. A. Smith, 1931).—Station is 1.3 miles south of railroad crossing in village of Warren, 26.8 meters (88 feet) west of Highway No. 40, 17.6 meters (58 feet) east of the east rail of the Texas & New Orleans Railroad, and 97.8 meters (321 feet) north by east of the railroad sign "1 mile to Hyatt." Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 7 meters (23 feet) east of highway, and 59.45 meters (195.0 feet) from station, in azimuth $209^{\circ}54'$; no. 2 is 7 meters (23 feet) east of highway, about midway between the forked entrance to the driveway to section house situated to west, and approximately 300 meters (984 feet) from station, in azimuth $347^{\circ}38'41''$.

Hillister (Tyler County, P. A. Smith, 1931; 1933).—On Highway No. 40, 7.8 miles south of Woodville, 1.5 miles north of railroad crossing in Hillister, and about one-fourth mile west of small white house east of highway, on the southern end of a sandy, wooded knoll belonging to the Kirby Lumber Co. Station is 30.3 meters (99 feet) west of the highway, and about 360 meters (1,181 feet) south of the northwest corner of a fence line east of highway. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line 10 meters (33 feet) east of highway, about 50 meters (164 feet) south of fence corner to north, and 311.77 meters (1,022.9 feet) from station, in azimuth $182^{\circ}17'09''$; no. 2 is in fence line 11 meters (36 feet) east of highway, about 30 meters (98 feet) north of a jog in fence line for curve to east in highway, and 60.59 meters (198.8 feet) from station, in azimuth $302^{\circ}22'$.

Cross (Hardin County, P. A. Smith, 1931).—About 7 miles, airline, east of Village Mills, about 10 miles, airline, southeast of Warren, about three-fourths mile, airline, south of the Tyler-Hardin County line, 18 meters (59 feet) north of small blazed pine (as if marking some land corner) in southeast quadrant of road intersection. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 3 meters (10 feet) east of center line of road, about 13 meters (43 feet) southwest of road intersection, and 30.20 meters (99.1 feet) from station, in azimuth 349° ; no. 2 is 3 meters (10 feet) north of center line of road, about 65 meters (213 feet) northwest of road intersection, and 55 meters (180 feet) from station, in azimuth $106^{\circ}50'$.

Village Mills south (Hardin County, P. A. Smith, 1931).—Station is 0.4 mile by road south of Village Mills, 100 meters (328 feet) southwest of Village Mills

schoolhouse, on the right-of-way of the Texas & New Orleans Railroad, 62 meters (203 feet) west of Highway No. 40, 12.2 meters (40 feet) east of the east rail of the railroad, 37.4 meters (123 feet) north by east of "whistling post", and 36.2 meters (119 feet) southeast of a 16-inch holly tree which is 10 meters (33 feet) southeast of a house belonging to Jeff Wilkerson. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1, an "A" station, is 55 meters (180 feet) south of the Village Mills railroad station, $1\frac{1}{2}$ meters (5 feet) east of the east rail, and about one-third mile from station, in azimuth $177^{\circ}36'53''$; top of mark is flush with ground; no. 2 is 11 meters (36 feet) west of highway, and 51.41 meters (168.7 feet) from station, in azimuth $256^{\circ}31'$.

Olive (Hardin County, P. A. Smith, 1931).—About $2\frac{1}{2}$ miles, airline, west of Olive siding on the Texas & New Orleans Railroad, 5 miles north by west of Kountze, $2\frac{1}{2}$ miles northeast of Honey Island, and about one-half mile south of Roth's farmhouse, in the southeast corner of the Nathaniel Witcher survey, on land belonging to the Houston Oil Co. To reach from Kountze go north along Highway No. 40, 5.2 miles from the Colorado & Santa Fe Railroad crossing at north edge of town, thence west over plank bridge, and continue westerly to crossroad at $1\frac{1}{4}$ miles, there turn southwest and go 0.9 mile to point where road is crossed by a north-and-south road. Station is 18.4 meters (60 feet) east of crossroad, 8.4 meters (28 feet) northeast of road to southeast, and 25.1 meters (82 feet) west of southwest one of three blazed 8-inch pine trees. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 3 meters (10 feet) east of road, at split in road, and about 190 meters (623 feet) from station, in azimuth $222^{\circ}48'54''$; no. 2 is 3 meters (10 feet) west of cut-off road between road to north and road to southwest, and is 42.29 meters (138.7 feet) from station, in azimuth $77^{\circ}04'$.

Reeves (Hardin County, P. A. Smith, 1931).—Six miles by road northeast of Kountze, about 60 meters (197 feet) south of road, about 100 meters (328 feet) east of Mr. Gravey's house, in a clump of 80-foot pines, on land belonging to John Reeves, of Silsbee, about 17 meters (56 feet) east of a split-rail fence, and 25 meters (82 feet) northeast of corner of same fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of wire fence, 6 meters (20 feet) south of center line of road, and 300 meters (984 feet) from station, in azimuth $87^{\circ}16'52''$; no. 2 is 1 foot east and south of corner of wire-fence line, about 8 meters (26 feet) south of center line of road, and 67.56 meters (221.7 feet) from station, in azimuth 149° .

Kountze (Hardin County, P. A. Smith, 1931).—Six miles, by road, southwest of Kountze, on the road that leads west from north of the courthouse, taking the right-hand fork at distance of 2.7 miles. Station is 30.2 meters (99 feet) north of highway at west end of long tangent broken by S curve to south and west, 200 meters (656 feet) west of east fork and 150 meters (492 feet) east of west fork of tramway, about 200 meters (656 feet) northeast by east of Mr. Beaumont's house, on land belonging to the Nona Lumber Co., 8.1 meters (27 feet) south of blazed 12-inch pine tree, and 18.0 meters (59 feet) northeast of 8-inch blazed pine tree. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 5 meters (16 feet) south of highway, and 49.27 meters (161.6 feet) from station, in azimuth $304^{\circ}30'$; no. 2 is 6 meters (20 feet) south of highway, 15 meters (49 feet) east of tramway, and about 135 meters (443 feet) from station, in azimuth $31^{\circ}28'48''$.

Ellis (Hardin County, P. A. Smith, 1931).—About $5\frac{1}{2}$ miles, airline, southeast of Kountze, about $4\frac{1}{2}$ miles, airline, west-southwest of Silsbee, about three-fourths mile east of Highway No. 40, in the farmyard of Mr. Ellis, about 100 meters (328 feet) southeast of his house, 13.2 meters (43 feet) east of the southeast corner of a covered feed rack, 9 meters (30 feet) west of wire fence, and about 27 meters (89 feet) southwest of southerly high gate post in same wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of wire fence, 5 meters (16 feet) north of center line of road leading to Ellis' house, about 120 meters (394 feet) west of corner of wire fence, and 200 meters (656 feet) from station, in azimuth $114^{\circ}28'15''$; no. 2 is 1 foot north of wire fence, 17 meters (56 feet) east of corner of wire fence, 15 meters (49 feet) west of intersection of fence lines, and 76.50 meters (251.0 feet) from station, in azimuth $8^{\circ}29'$.

Grigsby (Hardin County, P. A. Smith, 1931).—On the Sour Lake Road, 9.3 miles southwest of Kountze, about 8 miles, airline, north by east of Sour Lake, on land belonging to Mr. Clippenger and managed by Mr. Brown, about 50 meters (164 feet) south of farmhouse, 14.1 meters (46 feet) west of road, 22.1 meters (73 feet) south of garage, and 33.7 meters (111 feet) north of a 10-inch magnolia tree with an old cross on it which is west of the road on the boundary between the Enoch Grigsby and George Stephenson surveys. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 4 meters (13 feet) south of the southwest corner of small lot, and 27.79 meters (91.2 feet) from station, in azimuth $118^{\circ}30'$; no. 2 is in fence line 5 meters (16 feet) east of road, about 15 meters (49 feet) south of fence corner, and approximately 110 meters (361 feet) from station, in azimuth $190^{\circ}38'07''$.

Ariola (Hardin County, P. A. Smith, 1931).—About $10\frac{1}{2}$ miles, airline, south-east of Kountze, about $4\frac{1}{2}$ miles, airline, north-northwest of Voth, about 125 meters (410 feet) southwest of Ariola, a siding on the Texas & New Orleans Railroad, about 75 meters (246 feet) south of Mr. Whittington's house, on land belonging to him, about 300 meters (984 feet) west of Highway No. 40, 11.2 meters (37 feet) south of road, and about 12 meters (39 feet) west of a 24-inch gnarly tree (not pine). Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of wire fence, 15 meters (49 feet) west of center line of railroad, and about 75 meters (246 feet) north of road leading to station, and 150 meters (492 feet) from station, in azimuth $209^{\circ}16'53''$; no. 2 is 2 feet south of wire-fence line, and 36.94 meters (121.2 feet) from station, in azimuth $299^{\circ}06'$.

Perl (Jefferson County, P. A. Smith, 1931).—About 8 miles, airline, northwest of Beaumont, about $2\frac{1}{2}$ miles, airline, southwest of Voth, about 2.0 miles west of Highway No. 40, at Griffing's Nurseries, 12.2 meters (40 feet) north of center line of shell road, 15 meters (49 feet) northeast of T-intersection of center lines of roads, and 11.5 meters (38 feet) northeast of corner of wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 8 meters (26 feet) north of center line of shell road, and 280 meters (919 feet) from station, in azimuth $270^{\circ}12'16''$; no. 2 is 1 foot east of a wire fence, 8 meters (26 feet) west of center line of shell road, 8 meters (26 feet) south of the most southerly large gate post, and 31.55 meters (103.5 feet) from station, in azimuth $42^{\circ}29'$.

Sour (Hardin County, P. A. Smith, 1931).—About $4\frac{1}{2}$ miles, airline, north of China, 4.2 miles, by road, southeast of Sour Lake, on the Beaumont-Sour Lake Road, and immediately north of the Sour Lake & Western Railroad, in the southeast corner of the Henry Stevenson survey, on land belonging to the Kirby Lumber Co. Station is on a small mound of dirt 26.4 meters (87 feet) north of road, and 62.2 meters (204 feet) northwest of north rail of the railroad. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in the right-of-way fence line, about 12 meters (39 feet) northeast of road, and 47.00 meters (154.2 feet) from station in azimuth $348^{\circ}44'$; no. 2 is 8 meters (26 feet) southwest of road, about 30 meters (98 feet) beyond second power pole to west, and approximately 180 meters (591 feet) from station, in azimuth $113^{\circ}40'48''$.

Supplementary points

Loutexark ecc. (Cass County, P. A. Smith, 1930).—An unmarked station 6.88 meters (22.6 feet) in azimuth $70^{\circ}40'$ from station *Loutexark boundary monument* (see description thereof). A standard tablet was set in a stone boundary post on line to station *Ravana* (azimuth $190^{\circ}29'55''$).

Loutexark boundary monument (Texas-Arkansas-Louisiana boundary, P. A. Smith, 1930).—About 9 miles southeast of Atlanta, 11 miles north of Vivian, and 50 feet north of route 47, at a small settlement known locally as "Three States." Marked by standard disk station mark in top of boundary post of stone, about 10 inches square, and projecting 18 inches above ground. A standard tablet was set in a stone boundary post on line to station *Ravana* (azimuth $190^{\circ}29'55''$) from *Loutexark ecc.*, an unmarked station 6.88 meters (22.6 feet) from station in azimuth $70^{\circ}40'$.

Oak (Texas-Louisiana boundary, P. A. Smith, 1930).—A supplementary station, on the Texas-Louisiana boundary, $9\frac{1}{2}$ miles, airline, west by south of

Blanchard, 9 miles north-northwest of Greenwood, and 4.8 miles by road west of Bryson's store. Best reached from Bryson's store, which is 5.9 miles west of Blanchard on the Furrh road. From store continue west 4.3 miles to fork at Negro schoolhouse; take left fork and go one-half mile to State boundary, and there turn south and go 100 yards or 50 yards beyond road leading west into Texas with a 4-foot oak tree opposite road in fence line. Station is in fence line, east of the north-and-south road, and on top of a knoll about 50 yards south of the 4-foot tree. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a).

GULF COAST ARC

Principal points

Rogers (Nueces County, H. D. King, 1905).—One-fourth mile south of Rogers railway station on the Texas Mexican Railway, 15.79 meters (51.8 feet) east of the board fence which is on the east line of the Driscoll ranch, 8.3 meters (27 feet) east of center of road leading south from Rogers, and 3 miles by wagon road or railroad east of Robstown, the junction point of the Mexican National and the St. Louis, Brownsville & Mexico Railways. Surface mark is nail in terra-cotta pipe set in concrete, note 24. Underground mark is similar to surface mark, and is $2\frac{1}{2}$ feet below the surface, note 30. Reference mark is similar to underground mark, is described in note 41, and is 8.3 meters (27 feet) east of center of road, 15.67 meters (51.4 feet) east of Driscoll ranch line fence, and 25.76 meters (84.5 feet) from the station, in azimuth $179^{\circ}21'$. The following distances and azimuths are from the station: Southwest gable of section house, one-fourth mile, $130^{\circ}40'31''$; Rogers stock pens, north post of chute, $175^{\circ}33'25''$; windmill at railway crossing, $2\frac{1}{2}$ miles, $264^{\circ}21'20''$; windmill, $1\frac{1}{2}$ miles, $275^{\circ}34'20''$; windmill, one-fourth mile, $329^{\circ}59'20''$. In 1930 a thorough search revealed nothing but some fragments of concrete in the vicinity of the station and reference mark. The underground mark is probably still in place, but the ground was too hard for prodding, and it can be relocated only by triangulation. In 1930 station site was in cotton field, 20 yards east of road. Site of reference mark was in southwest corner of small pasture, north of a cotton field. Entire area is subject to cultivation.

Kaleta (San Patricio County, H. D. King, 1905; 1931).—About 2 miles east of Kaleta post office, about 5 miles east of Sharpsburg, and 4 miles east of Angelita, a station on the St. Louis, Brownsville & Mexico Railway; about 10 miles southwest of Taft, and 4 miles southeast of Odem, on a low bench covered with dense growth of mesquite, on land owned in 1930 by Turner Bros. Station is one-half mile east of Turner Bros.' windmill, one-half mile northeast of the Kaleta-Portland wagon road, and 200 yards northeast of an old road leading from windmill along top of ridge. In 1930 to reach from Odem on route 128, go east 3 miles, thence south 1 mile to gate at Turner's ranch. From ranch take track through gate out of barn lot, just southwest of house, and follow it southeast one-half mile to where it swings to right through gate in an east-and-west fence. Follow it south 100 yards to where it turns east into brush, but keep straight ahead along west edge of brush to southeast corner of cleared field; pass through fence on south side of field, and along south side of fence to thirty-seventh post east of field corner, then bear to right 160 yards to station. The original marks, nails in concrete, notes 24 and 30, were replaced in 1931 with standard disk station marks in concrete, notes 1 (a) and 7 (a), the disks being stamped: Kaleta, 1905, 1931. The 1905 reference mark, a nail in concrete, note 41, was replaced in 1931 with a standard reference disk in concrete, note 11 (a), and the disk stamped R.M. 1, 1905, 1931. It is 89.51 feet from station, in azimuth $175^{\circ}19'$. In all cases the disks were centered in the positions of the old marks. Reference mark no. 2, 1931, is standard reference disk in concrete, note 11 (a), 659.35 feet from the station, in azimuth $70^{\circ}02'02''$. Azimuth of lone oil derrick, distant approximately 4 miles, is $69^{\circ}54'30''$. Other distances and azimuths (1905) are: Sharpsburg schoolhouse belfry, 5 miles, $99^{\circ}51'50''$; Angelita railway station, east gable, 4 miles, $103^{\circ}02'10''$; Turner Bros.' house, chimney, three-fourths mile, $144^{\circ}48'04''$; R. E. Turner's house, chimney one-half mile, $169^{\circ}27'47''$; "Ratana" windmill, 3 miles, $225^{\circ}51'46''$.

Corpus (Nueces County, H. D. King, 1905; 1911).—On lot 1, block 33, of the central wharf and warehouse addition to Corpus Christi, about seven-eighths mile southwest of the post office, one-half mile west of the Mexican National Railway station, 43.02 meters (141.1 feet) south of the south rail of main track,

measured at right angles to the track, and 88.5 meters (290 feet) north of the northwest corner fence post of the Hebrew burying ground. Lot is surrounded by fence, and station is 10.87 meters (35.7 feet) west of east fence, 26.12 meters (85.7 feet) south of north fence, and 12.97 meters (42.6 feet) north of south fence. Surface mark is spike in terra-cotta pipe filled with and set in concrete, note 24. Underground mark is similar to surface mark, except that there is no inscription; it is 2½ feet below surface and is described in note 30. Reference mark is similar to underground mark, is described in note 41, and is 20.32 meters (66.7 feet) from station, in azimuth 2°32'. Later reported that many new houses, oil tanks, and large buildings had been erected around this station.

Portland (San Patricio County, H. D. King, 1905; 1931).—About 7 miles north by east of Corpus Christi, and about 1 mile northwest of Portland, a village on route 16, in a cultivated field in 1905 belonging to Robert Arnold, who lived in Portland. Station is 100 paces east-northeast from edge of bluff above Nueces Bay, 7.11 meters (23.3 feet) west of fence on west side of Portland-Kaletta wagon road, and 163.5 feet southeast from the southwest corner of small blue house, owned by Mr. Arnold and occupied by a Mexican tenant. In 1931 station was reached from Portland at angle at filling station where route 57 turns from north to east, by going west 1 block, then north 1.0 mile to station, which is at angle where road turns from west to north, 8 paces southwest of outside ditch of short curve at this point. Station was originally marked underground and at surface by nails in terra-cotta pipes filled with and set in concrete, notes 24 and 30. In 1931 a new surface mark was set consisting of a standard disk station mark in concrete, note 1 (a). The 1905 reference mark is a nail in 4-inch terra-cotta pipe filled with and set in concrete, note 41. Its top is flush with the ground. It is just inside the fence corner where the fence between house lot and cultivated field joins the road fence, and 39.97 meters (131.1 feet) from the station, in azimuth 190°32'. In 1931 two additional reference marks were set, standard reference disks in concrete, note 11 (a). About 1 mile from Portland the road makes a sharp bend to the west for 100 yards, then turns sharply to the right for about one-fourth mile. R.M. no. 1 is at about the center of the second bend, 32 feet northeast of the center of the road, 107 paces north of a house near the bend, and 0.2 mile from station, in azimuth 183°02'54". R.M. no. 2 is 20 feet north of center line of road, just south of and about 50 feet east of first bend mentioned above, on edge of field near road ditch, and 121.14 feet from station in azimuth 259°57'. The following distances and azimuths are from station: Farmhouse, east gable, one-fourth mile, 127°43'06"; Arnold's tenant house, southwest corner, 49.83 meters (163.5 feet), 157°36'; Portland, San Antonio & Aransas Pass Railway station, chimney, 299°39'51"; Bay View College, recitation hall, belfry, 1¼ miles, 321°15'39"; Bay View College, dormitory chimney, 322°05'14".

Fairview (Nueces County, F. L. Gallen, 1931; 1933).—About 3 miles west of Corpus Christi, in the rear of the grounds of the Fairview school, approximately 120 feet south of the brick school building and in the southwesterly corner of the grounds, 32.5 feet northeast of southwest corner of fence, 24.3 feet north of south fence, and 23.0 feet east of west fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 2 inches above ground, is 11.00 feet southeast of the southeast corner of the old (wooden) school building, 0.95 foot west of the east fence, in the same part of the grounds as the station, and 94.32 feet therefrom, in azimuth 278°. No. 2 projects 2 inches above ground, is in the southwest corner of the first T-crossroad west of the Fairview school, 39 feet west of the center line of the shell road leading south, 29 feet south of the center line of the paved highway leading west, and approximately 0.15 mile from station, in azimuth 157°21'34". Station reached from Corpus Christi by going west on Leopard Street to a bakery on outskirts of town, thence south 0.2 mile, and west 1.8 miles to the Fairview school which is on south side of road.

Johnson (San Patricio County, F. L. Gallen, 1931).—About 3 miles southwest of Taft, in southwest corner of section line crossroads, in an unused pasture owned by Hugh Johnson, about 100 feet east of his barn, 300 feet south of his house, 42 feet south of center line of one section line road, 38 feet west of other, and 24.7 feet southwest of gasoline pump in fence corner. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 3 inches above ground, is in southeast corner of section line crossroads, 57 feet east of center line of one road and 19

feet south of other, 36.3 feet east of fence corner post, and is 97.09 feet from station, in azimuth 259°14'. No. 2 projects 4 inches above ground, is 0.15 mile south of crossroads, on south side of front yard of house, 73.0 feet south of southeast corner of frame house, 46.45 feet east of southeast corner of frame garage, 38 feet west of center line of dirt section line road, and approximately 0.15 mile from station, in azimuth 1°07'50". *B.M. F 9 (U.S.G.S.)* is 60.00 feet from station, in azimuth 252°17'. Azimuth from station of north tank of Central Light & Power Co., Taft, distant 3 miles, is 208°05'19". Station reached from Taft by dirt road leading southwest from route 16 at railroad freight station and Texaco plant 2.3 miles to dirt road leading south at acute angle; follow south 1.0 mile to section corner and station.

McGloins Bluff (San Patricio County, S. A. Gilbert, 1860; 1931).—About 11 miles east of Corpus Christi and 4 miles south of Ingleside, on McGloins Bluff, on the north shore of Corpus Christi Bay, on a high sand dune near the extreme western end of McGloins Bluff, and overlooking Ingleside Cove. To reach station from Ingleside follow gravel road south 3.3 miles to its end at Ingleside Cove, thence around the bay shore 0.7 mile to O. D. Ford's house. Station is 150 yards east of Ford's house, 175 yards north of small brown house on shore, on highest sand hill, about 40 feet elevation and covered with scrub oak. Land owned by Ingleside Land Co. Original mark was bottle buried 3 feet below ground, with four iron reference posts, each distant about 6 feet from station, set such that lines joining opposite posts intersected at right angles over station mark. In 1912 old mark and two reference posts were recovered and station was remarked with standard disk station marks in concrete, notes 1 (b) and 7 (a). A concrete reference mark set in 1912 is 19.2 meters (63.0 feet) from the station. The angle at the station between the reference mark and the flagpole on the cupola of the Ingleside Inn is 61°55'. The following azimuths are from the station: Water tower at Gregory, 147°45'12"; southwest gable of farmhouse, distant 1 mile, 171°10'58"; chimney on ell of a large 2½-story house near Ingleside Hotel, 178°02'04"; chimney on James Stern's house, distant one-half mile, 179°46'18". Two cast-iron reference marks are about 6 feet from the station. In 1930 third reference mark, probably the concrete mark, was not found. In 1931 station mark recovered in good condition, and "1931" stamped thereon: Two additional reference marks, established in 1931, are standard reference disks in concrete, note 11 (a). No. 1 is 16.65 meters (54.6 feet) from station, in azimuth 105°19'. No. 2 is on the west side of the road, near the only two houses in the vicinity, 0.44 meter (1.4 feet) east of fence line, 6.50 meters (21.3 feet) west of center line of road, 13.45 meters (44.1 feet) south of fence corner, and about one-fourth mile from station, in azimuth 162°26'19". The azimuth from the station of the Port of Corpus Christi-Fairview tank, distant 11 miles, is 83°56'08".

Floerke (San Patricio County, F. L. Gallen, 1931).—About 12 miles north of Corpus Christi, 4 miles southeast of Taft, and 3½ miles northwest of Gregory, on south side of paved route no. 16, on land owned by George Floerke, just east of Midway railway station, about 300 yards southeast of switch, in stock lot, 30 yards northwest of Floerke's house, 10 yards northeast of barn, 67.7 feet southwest of southwest rail, and 21 feet south of right-of-way fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is between highway and railway, 6 feet inside railway property line, about one-fourth mile northwest of T-road leading northeast along high line, about 35 feet northeast of tracks, about 90 feet east of switch on track, and about 300 meters (984 feet) from station, in azimuth 128°36'11". No. 2 is 45 feet northeast of center of railway track, about 60 feet northwest of above-mentioned high line which crosses tracks, and nearly opposite track from station, being 115.3 feet from station, in azimuth 222°10'.

Blanco (San Patricio County, F. L. Gallen, 1931).—About 14 miles northeast of Corpus Christi, 6 miles east of Taft, on the Blanco ranch, owned by E. E. Jacobs, on north side of a public dirt road, about 1,000 feet west of small wooden bridge crossing a gully, and north of the buildings of the Rancho Blanco, in an uncultivated plot of ground. Station is 84.5 feet northeast of fence corner marking the road right-of-way on the south and the northeast corner of a pasture which is west of the ranch houses, 80 feet northwest of center of gate-posted entrance to ranch yard, and 42 feet north of center line of main dirt road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 6 inches above surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 extends 3 inches above

ground, on south side of dirt road, near east gate post of ranch entrance, about 125 feet north of windmill in yard, 85 feet east of fence corner, 30 feet south of center line of main dirt road, 15 feet east of center of entrance to ranch, and 86.69 feet from station, in azimuth $325^{\circ}42'$. No. 2 extends 4 inches above ground, is on north side of main dirt road, 32 feet north of center line of road, 0.3 mile west of entrance to Rancho Blanco, 2.4 feet northeast of fence corner, and approximately 0.3 mile from station, in azimuth $89^{\circ}00'49''$. North tank, Taft, C. L. & P. Co., is in azimuth $88^{\circ}03'58''$ from station. Station reached from Taft by dirt section road leading east from north part of town 6 miles to station.

Aransas (San Patricio County, F. L. Gallen, 1931).—About 17 miles northeast of Corpus Christi, 1 mile northwest of the town of Aransas Pass, on summit of a bushy ridge, approximately 1 mile west of the new municipal water tank, and 50 feet north of center line of Highway No. 57. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is 40 feet south of center line of Highway 57, and is 89.73 feet from station, in azimuth $29^{\circ}56'$. No. 2 projects 6 inches above ground, is 44 feet south of center line of Highway No. 57, and is approximately 0.3 mile from station, in azimuth $117^{\circ}43'28''$. Station reached from Aransas Pass by route 57, northwest 1.6 miles from main street, and past municipal tank about 1 mile.

Bayside (Refugio County, F. L. Gallen, 1931).—About 14 miles northwest of Rockport, in the village of Bayside, on west shore of Copano Bay, in fence line between property of village and of Bert R. Hand, 84.3 feet south of southwest corner of Hand's house, and 33 feet southwest of a double mesquite tree. Reached from Rockport via the Bayside-Rockport road about 14 miles to Bayside; Hand's house is in southeast part of village, just south of road leading to causeway, and opposite M. G. Autrey's grocery store and filling station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is between road and beach, 4 yards west of beach and 8 yards east of center line of road, approximately on range between bath house on pier of F. B. Rooke apartment house and last house on bluff southwest of town with radio ball on roof, and 0.2 mile from station, in azimuth $27^{\circ}16'01''$. No. 2 is 29 feet north of center line of road, 29.2 feet south of southeast corner of M. G. Autrey's grocery store and filling station, and 177.7 feet from station, in azimuth $130^{\circ}28'$. Mary R.M. no. 2 (1911), standard reference disk above and bottle below, both in concrete, is in a grass plot between road at edge of bluff and Hand's fence, 11 yards northwest of center line of road, and 64.65 feet from station, in azimuth $275^{\circ}30'$. Azimuth from station of *Rockport courthouse dome*, is $294^{\circ}02'25''$.

Rockport (Aransas County, F. L. Gallen, 1931).—In the town of Rockport, in the southwest corner of courthouse grounds, 33.5 feet east of gate in iron fence at southwest corner of courthouse yard, 30 yards southwest of southwest corner of building, and 15.4 feet north of iron fence along southerly side of yard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at fence corner, inside southeast corner of courthouse yard, and 67.626 meters (221.87 feet) from station, azimuth not observed. No. 2 is at fence corner, outside southeast corner of courthouse yard, and one-fourth mile from station, in azimuth $173^{\circ}45'28''$.

Lamar (Aransas County, F. L. Gallen, 1931).—About 8 miles north of Rockport, on point of land between Copano and St. Charles Bays, at small settlement of Lamar about 1 mile east of the north end of the causeway, 128 feet east of east post of gateway entering churchyard, 25 feet south of center line of road, and 3.62 feet north of wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 2 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 12 inches above ground, is 109 feet northeast of east post of gateway to churchyard, 43 feet north of center line of road, 70.8 feet north of wire fence, and 80.95 feet from station, in azimuth $191^{\circ}05'$. No. 2 projects about 12 inches above ground, is 40 yards north of curve in road, 36.9 feet south of northwest corner of fence, 7 feet east of center line of dirt road, 0.75 foot west of wire fence, and approximately 0.15 mile from station, in azimuth $303^{\circ}52'35''$. Station reached from Rockport by way of new causeway

For notes in regard to marking of stations see p. 154.

north; at north end of causeway turn east and go about 0.9 mile on old shell road to Lamar church, and station about 60 yards east of church.

Causeway (Aransas County, F. L. Gallen, 1931).—About $6\frac{1}{2}$ miles north of Rockport, on Live Oak Point, on right-of-way of new highway, 160 feet southwest of south end of Copano causeway, 126 feet west of center of highway, on a sand dune about 20 feet above sea level. Station is surrounded by brush. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is about 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at south end of concrete roadway where trestle ends and fill begins, 4 feet east of east edge of concrete at foot of a "No Loitering" sign, and about 0.25 mile from station, in azimuth $215^{\circ}53'35''$. No. 2 is about 150 feet south of south end of causeway, about 90 feet south of junction of beach road and highway, on east side of highway at top of cut, $1\frac{1}{2}$ feet from a highway station mark which consists of a concrete post extending about $1\frac{1}{2}$ feet above the ground, and 227.60 feet from station, in azimuth $335^{\circ}30'$. Azimuth from station of white tank near Lamar is $230^{\circ}57'33''$.

Hallinan (Refugio County, F. L. Gallen, 1931).—About 15 miles east of Refugio and 13 miles southwest of Tivoli, on the Hallinan ranch, approximately 1.5 miles west of a bridge near ranch houses which are conspicuous because of three large silos, just past a jog in the road, 308 feet west of a board gate at a point in the road where there are two wooden gates opposite each other, 34 feet north of the center line of the road, and 0.40 foot south of the north right-of-way fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 6 inches above the ground, is 31 feet south of center line of road, 0.8 foot north of south right-of-way fence, and approximately 0.2 mile from station, in azimuth $268^{\circ}25'13''$. No. 2 projects about 2 inches above ground, is 28 feet south of the center line of road, 0.7 foot south of the south right-of-way fence, and 97.19 feet from station, in azimuth $41^{\circ}42'$. Station reached from Tivoli by new State highway south 5.5 miles to dirt road leading to right; follow this dirt road, the old Refugio road, 9.3 miles to station.

Cardwell (Aransas County, F. L. Gallen, 1931).—About 8 miles south of Austwell, on the St. Charles ranch, owned by the San Antonio Loan & Trust Co., and in charge of A. L. Cardwell, overseer. Reached by State roads to Tivoli, thence about 7 miles southeast to Austwell, thence on road south from gins 1.5 miles across crossroads to sharp jog to right of 0.1 mile; take jog and thence left (west) again 1.1 miles; thence south 4.2 miles to end of graded road at gate. Pass through gate and follow ranch road southwest 1 mile to second gate and continue on about one-half mile to a ranch house; pass ranch and continue southwest 0.7 mile to third gate near ranch house; 100 yards past gate take left-hand fork (right leads to Hallinan ranch) and go 0.5 mile to fourth gate; continue south 0.4 mile to ranch house, pass through gate at house and go 100 yards to station which is on a slight knoll about 85 yards southeast of house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper marks extend 3 inches above surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line which leads to house, and is 0.2 mile from station, in azimuth $98^{\circ}02'05''$. No. 2 is about 200 feet east of house, 5.38 feet south of an east-and-west fence line, the same near which station is located, and 152.50 feet from station, in azimuth $156^{\circ}17'$.

Austwell (Refugio County, F. L. Gallen, 1931).—About 1 mile east of town of Austwell, on southwest side of Hines Bay, on ranch owned and occupied by W. J. Stark. Station is in small pasture lot around well, in front of barns, 89.5 feet south of well, 14 feet north of south fence around lot, 75.7 feet southeast of tangent to large concrete foundation for silo, and 70.2 feet southwest of east concrete pier of water trough. Reached by following main street of Austwell southeast to point where it turns south toward Austwell gin; keep ranch road straight ahead 1.1 miles to Stark's ranch. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is under south edge of water tank, 83.7 feet from station in azimuth $218^{\circ}46'$. No. 2 is 8 feet south of corner post at first fence corner west of row of tenant houses, 120 yards northwest of last house in row, 15 yards southwest of head of small ravine making toward beach, and about 0.2 mile from station in azimuth

129°56'07''. Azimuth from station of *Austwell, municipal tank*, distant 1.0 mile, is 118°17'36''. Station *Austin* (see description thereof) is 125.2 meters (411 feet) from station in azimuth 274°52'32''.

Fagan (Refugio County, F. L. Gallen, 1931).—About 20 miles south of Victoria and 6 miles west of Tivoli, on south side of highway from Tivoli to Inari, approximately 200 yards west of the first grove of mesquite and huisache west of Tivoli and north of highway, about 100 yards west of two board gates on opposite sides of road, 79 feet south of the center line of highway, 29.5 feet south of the right-of-way fence, 35 feet southeast of the northeast corner of cultivated field, and 12.7 feet east of the division fence of two large fields. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 5 inches above ground, is 94 feet west of a cattle guard to field on north side of highway, 52 feet north of center line of highway, 2.0 feet north of the north right-of-way fence, and 143.61 feet from station, in azimuth 229°55'. No. 2 projects about 6 inches above ground, on north side of highway at point where there are double board gates on opposite sides of highway, 68 feet north of center line of highway, 16.0 feet north of the division post of the north gates, 0.80 foot east of fence line dividing two large fields, and approximately 0.4 mile from station, in azimuth 119°57'32''.

Welder (Calhoun County, F. L. Gallen, 1931).—About 12 miles southwest of Port Lavaca, and 3 miles northwest of the small village of Green Lake, on the southwest side of the Missouri Pacific Railway, and of the gravel road from Seadrift to Victoria, 0.25 mile northwest of a point where the road crosses from the southwest to the northeast side of railroad, 55 feet west of whistle board, 36.50 feet southwest of west rail and 12.0 feet northeast of fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 4 inches above ground, is approximately one-fourth mile northwest of grade crossing, 31 feet northeast of center line of road, 1.4 feet northeast of fence line, and 151.55 feet from station, in azimuth 234°25'. No. 2 projects about 12 inches above ground, is 45.6 feet southwest of west rail of railroad, 2.2 feet northeast of fence, and approximately 1,960 feet from station, in azimuth 147°22'24''.

Roemer (Calhoun County, F. L. Gallen, 1931).—About 10 miles south of Port Lavaca, and 4 miles north of Seadrift, on east side of the Port Lavaca-Seadrift shell road (route 29), 3.45 miles northeast of its junction with the Victoria-Seadrift shell road, in the west corner of a pasture northeast of farmhouse occupied by Joe McConn, on land belonging to E. A. Roemer of Elgin, 42 meters (138 feet) northeast of farmhouse, 26.48 meters (86.9 feet) north of north corner of barn, 16.9 meters (55 feet) southeast of center line of highway at point about 60 meters (197 feet) northeast of concrete box culvert, 4.49 meters (14.7 feet) southeast of wire fence, and 9.32 meters (30.6 feet) east of east side of a pig lot. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 2 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above ground, is 12.2 meters (40 feet) northwest of center line of shell highway (route 29), northeast of junction with Victoria-Seadrift road, on southeast side of farm yard in D.M. Priddy, between house and barn, 30 meters (98 feet) east of house, 20 meters (66 feet) northeast of lane to house, 22.18 meters (72.8 feet) southwest of the southwest corner of barnyard, 0.36 meter (1.2 feet) northwest of wire fence line, and approximately 0.3 mile from station, in azimuth 225°03'38''. No. 2 extends 6 inches above ground, is 12.8 meters (42 feet) northwest of center line of route 29, 3.4 miles northeast of its junction with the Victoria-Seadrift road, 45 meters (148 feet) northeast of a concrete box culvert, on the northwest side of road to Roemer's house, 42 meters (138 feet) northeast of fence corner, 0.47 meter (1.5 feet) northwest of wire fence line, and 32.45 meters (106.5 feet) from station, in azimuth 117°12'. Azimuth from station of *Port Lavaca, municipal tank*, distant 10 miles, 198°54'23''. Station reached from Port Lavaca by Seadrift shell highway (no. 29) 12.5 miles to station.

Magnolia (Calhoun County, F. L. Gallen, 1931).—About 5 miles southeast of Port Lavaca, and 1 mile south of Gallinipper Point, on west shore of Lavaca Bay, near junction where road turns toward Magnolia Beach squarely to the right (southeast), and a dirt road leads straight ahead to the bay shore, 69 feet east of center line of shell road to Magnolia Beach, 36 feet south of center line of dirt road, 2.6 feet south of northwest corner of fence and 0.25 foot west of fence line.

Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 5 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 5 inches above ground, is on inside of curve of shell road to Magnolia Beach, 33.0 feet west of center line of shell road, 6.5 feet west of fence line, and 165.11 feet from station, in azimuth $342^{\circ}27'$. No. 2 projects about 5 inches above ground, is 39 feet north of center line of shell road, 12.7 feet north of southeast corner of pasture, 1.10 feet east of fence, and approximately 0.5 mile from station, in azimuth $55^{\circ}00'03''$. Station reached from Port Lavaca by route no. 29 southwest and southeast 4.6 miles to a road leading to left, or nearly straight ahead where main road curves to the right; follow this road toward Magnolia Beach, northeast 5 miles to station.

Wilson (Calhoun-Victoria Counties, F. L. Gallen, 1931; 1933).—About 6.7 miles northwest of the municipal tank in Port Lavaca, on the northeast side of the Port Lavaca-Lake Placedo shell road, on or very near the Calhoun-Victoria County line, on the crown of a low spoil bank between two cultivated fields, on land owned by Egan Wilson and rented by J. H. Cleveland, 0.8 mile northwest of a crossroads, 0.25 mile northwest of a frame house on southwest side of road, 19.5 meters (64 feet) north of a fence corner which is on southwest side of road, and 12.40 meters (40.7 feet) northeast of center line of shell road. The mound on which station stands is perpendicular to the road northwest of a drainage ditch crossing the road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 5 inches above surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above ground, is about 6.3 miles northwest of Port Lavaca, 8.5 meters (28 feet) southwest of center line of Port Lavaca-Lake Placedo shell road, 0.5 mile northwest of crossroads, 125 meters (410 feet) southeast of frame house, 0.75 meter (2.5 feet) west of fence corner, and 0.35 mile from station, in azimuth $327^{\circ}52'27''$. No. 2 projects 5 inches above ground, is 5.8 meters (19 feet) southwest of center line of shell road, 43.75 meters (143.5 feet) northwest of fence corner, 0.3 meter (1 foot) southwest of wire fence line, and 39.35 meters (129.1 feet) from station, in azimuth $120^{\circ}11'$. Azimuth from station of Port Lavaca, municipal tank, distant 6.7 miles, is $324^{\circ}10'29''$.

Cavallin (Calhoun County, F. L. Gallen, 1931).—About 10 miles south of La Ward, on land belonging to Guy L. Cavallin, outside the northeast corner of the cultivated field around his house, 81.5 feet south of center line of dirt road, 58.0 feet south of northeast corner of field, and 0.35 foot east of fence line. Reached from La Ward by going east on route 58 about one-fourth mile, turning south on the Olivia road, and going 10.6 miles south to section line leading east, and gate entering a road to west, also on section line. Follow this road through gate 0.6 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 2 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 4 inches above ground, is 58 feet south of center line of dirt road, 31.4 feet south of northwest corner post of fence, 0.8 foot east of fence line and approximately 0.4 mile from station, in azimuth $268^{\circ}09'32''$. No. 2 projects about 6 inches above ground, is 195.2 feet south of northeast corner of cultivated field, 1.5 feet east of fence line, and 137.20 feet from station, in azimuth $358^{\circ}20'$.

Lolita (Jackson County, F. L. Gallen, 1931).—About 12 miles southeast of Edna, in village of Lolita, 0.45 mile south and 0.1 mile west of Missouri Pacific Railway station, in fence line near northeast corner of school grounds, on school property, 68 meters (223 feet) northeast of school building, 23.5 meters (77 feet) south of center line of dirt road, 13.6 meters (45 feet) south of fence corner, and 0.33 meters (1.1 feet) west of wire fence between school grounds and I. N. Mitchell's land. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 10 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 extends 3 inches above ground, is 0.45 mile south of railway station at Lolita, southwest of a road corner, about 60 meters (197 feet) north of a house, 190 meters (623 feet) east of school, 16.6 meters (54 feet) southwest of center of road corners, 4.70 meters (15.4 feet) west of fence corner, 0.38 meter (1.2 feet) north of fence line, on south side of road right-of-way, and 125 meters (410 feet) from station, in azimuth $261^{\circ}59'14''$. No. 2 projects 3 inches above ground, is about one-fourth mile south and 0.1 mile west of railway station at Lolita, in the southeast corner of Baptist churchyard, near northeast fence corner of garden plot, 35.5 meters (116 feet) south of center line of dirt road, 17.13 meters (56.2 feet)

southeast of southeast corner of church, 10.3 meters (34 feet) west of fence line, 0.50 meter (1.6 feet) east of fence corner of another fence line, and approximately 0.2 mile from station, in azimuth $176^{\circ}26'39''$.

Slaikeu (Jackson County, F. L. Gallen, 1931).—About 10 miles west of Palacios, on east shore of Caranchus Bay, on land owned and occupied by L. J. Slaikeu, in the fence line between the barn lot and pasture to south, on opposite side of road from and 150 feet southeast of Slaikeu's house, southwest of the barn, 72 feet east of center line of road, 41.2 feet east of southwest corner of barn lot, and 0.55 foot south of fence line separating barn lot and pasture. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 3 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 8 inches above the ground, is 32 feet east of center line of road, 21.3 feet north of north side of cattle gate to barnyard, 0.85 foot west of west fence line of barn lot, and 137.53 feet from station, in azimuth $160^{\circ}43'$. No. 2 projects about 4 inches above ground, is 211 feet north of southeast corner of field, 20.5 feet west of center line of dirt road, 1.25 feet west of the north-and-south fence line around field, and approximately 0.5 mile from station, in azimuth $274^{\circ}40'03''$.

Francitas (Jackson County, F. L. Gallen, 1931).—About $8\frac{1}{2}$ miles west of Blessing, 0.7 mile south and 1.2 miles west of the railway station at Francitas, and 1.2 miles west of the Palacios road, in the northwest corner of a west-south turn on the La Ward Road, in sandy soil on a small spoil bank of a ditch running east and west, on east side of a large pasture leased by A. E. Landin, 16.4 meters (54 feet) northwest of the center line of road at turn 9.8 meters (32 feet) west of west gate post of gate into pasture, 0.79 meter (2.6 feet) west of wire fence line, and 5.20 meters (17.1 feet) south of fence corner post. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is about 65 meters (213 feet) north of the west-south turn in the La Ward Road, on northwest side of a small mound in sandy soil, in southwest corner of large pasture, 54.5 meters (179 feet) north of fence corner post, 27.90 meters (91.5 feet) east of fence between pastures, and 59.69 meters (195.8 feet) from station, in azimuth $180^{\circ}59'$. No. 2 projects 6 inches above ground is 0.7 mile south and 1.0 mile west of railway station, 1.0 mile west of Palacios Road, on south side of large pasture, 14.1 meters (46 feet) north of center line of La Ward Road, 2.97 meters (9.7 feet) north of wire fence line, and approximately 0.2 mile from station, in azimuth $267^{\circ}56'06''$. The church at Francitas is approximately 1.5 miles from station, and the azimuths of its west and east domes are $228^{\circ}17'40''$, and $228^{\circ}25'52''$. Reached from Francitas by Palacios dirt road 0.7 mile south from railway, thence west on La Ward dirt road 1.2 miles to station.

Palacios south base (Matagorda County, F. L. Gallen, 1931).—About 24 miles south of Bay City, in the town of Palacios, on the right-of-way of the Southern Pacific, west of a small railroad park, 167 feet north of the railroad station, 126 feet north of the center line of Highway No. 58, 27.50 feet west of west rail of main track, and 20.9 feet northeast of telegraph pole with mile board no. 68 on it. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 6 inches above the ground, is about 0.15 mile west of the high school, on the railroad right-of-way, 27.55 feet west of west rail, 46.75 feet southwest of switch stand, and 850 meters (2,789 feet) from station, in azimuth $180^{\circ}14'27''$. No. 2 projects about 5 inches above ground, is in the telephone pole line on east side of dirt road, east of small railroad park, 32 feet east of center line of dirt road, 99.5 feet north of center line of highway no. 58, 12.3 feet west of wire fence, and 150.01 feet from station, in azimuth $280^{\circ}33'$ azimuth from station of Palacios, municipal tank, distant 0.25 mile, is $231^{\circ}27'12''$.

Palacios north base (Matagorda County, F. L. Gallen, 1931).—About 18 miles southwest of Bay City, and $1\frac{1}{2}$ miles south of town of Blessing, on west side of right-of-way of the Palacios branch of the Southern Pacific, 1.7 miles south of the crossing of the railway and the main street in Blessing, 0.5 mile south of section line road intersection, 15.35 meters (50.4 feet) east of center line of dirt road paralleling the railway on west, 7.18 meters (23.6 feet) northeast of center of telegraph pole bearing mile board no. 58, and 6.57 meters (21.6 feet) east of wire fence between right-of-way of railway and road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Refer-

ence marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above ground, is 1.2 miles south of railway crossing of main street in Blessing, on west side of right-of-way of Southern Pacific branch to Palacios, near intersection of two dirt roads, 11.45 meters (37.6 feet) west of center of west rail, 13.49 meters (44.3 feet) southeast of the intersection of center lines of roads, 2.86 meters (9.4 feet) east of right-of-way fence line, and approximately 0.5 mile from station, in azimuth $180^{\circ}00'17''$. No. 2 projects 6 inches above ground, is in the northeast corner of a cultivated field on west side of dirt road paralleling railway on west, about 1.7 miles south of main street crossing in Blessing, 9.35 meters (30.7 feet) west of center line of road, 0.30 meter (1.0 foot) west of wire fence line, 0.80 meter (2.6 feet) south of its intersection with another fence, and 42.34 meters (138.9 feet) from station, in azimuth $35^{\circ}56'$.

Clapper (Matagorda County, F. L. Gallen, 1931).—About 11 miles southwest of Bay City, 3 miles south of village of Buckeye, on the Clapper Ranch, belonging to the E. H. Pierce estate. Station is on east side of road, 38 feet east of center line, 490.5 feet north of gate post at gate to Clapper Ranch, 119 feet west of galvanized iron pipe 2 inches in diameter, standing 3 feet above ground, and having a T connection with short section of pipe extending to west. Reached from Bay City by State road no. 58 west about 6 miles to Markham, a village a short distance north of the paving; follow dirt road south from Markham $4\frac{1}{2}$ miles to Buckeye; continue south on dirt road 0.7 mile from store to fork in road; take right-hand fork and go 3.0 miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of fence on west side of road, and 0.3 mile from station, in azimuth $90^{\circ}46'24''$. No. 2 is in fence line on west side of road, 66.2 feet from station, in azimuth $192^{\circ}56'$. Azimuth from station of tip of silo roof, distant three-fourth mile, is $319^{\circ}39'18''$.

Matagorda longitude station (Matagorda County, C. V. Hodgson, 1911; 1931).—About 20 miles south of Bay City, in the town of Matagorda, in a vacant lot belonging to the town, about 200 meters (656 feet), S. 20° W. (mag.) from the railway station, about 600 feet northwest of the Catholic Church, 400 feet southeast of the Santa Fe Railway tracks, 229 feet from the northwest corner of the school building, and 222.5 feet from its northeast corner, 74 feet northwest of the center line of one shell street and 156 feet southwest of the center line of another. This station was established 29.59 meters (97.1 feet) north and 78.37 meters (257.1 feet) east of triangulation station Bay View, 1906, on the old Bay View Hotel, which in 1930 was reported as lost, the hotel having been moved to a new site some half mile to the southeast. Station marked by a concrete pier, 18 by 36 inches, with foundation extending 24 inches below surface of ground, and a standard disk inscribed "Astronomic Station" set in the center of the notch of pier. In 1931 the marks were recovered in good condition, the disk was stamped: "Matagorda Longitude, 1911, 1931", and neat cement placed around it for reinforcement. Two reference marks were placed in 1931, being standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above the ground, is in the south corner of the street intersection, about 500 feet northwest of the church, 400 feet east of the school, 52 feet south of the intersection of center lines of two shell streets, 26.5 feet north of north corner of frame house, 2.3 feet northwest of property corner, and 165.70 feet from the station, in azimuth $282^{\circ}59'$. No. 2 projects 6 inches above the ground, is 3 blocks southwest and 1 block northwest of the church, 650 feet southwest of school, 50 feet south of intersection of center lines of two shell streets, in the north corner of front yard of bungalow, 54.8 feet north of north corner of house, and approximately 1,100 feet from station, in azimuth $54^{\circ}54'04''$.

Poole (Matagorda County, F. L. Gallen, 1931).—About 15 miles southeast of Bay City and 6 miles southeast of Wadsworth, on land owned by the Poole Cattle Co., of Bay City, near a large dipping corral south and west of the road, 239 feet southwest of the cattle gate on south side of dirt road, 199.5 feet from an artesian well and concrete water trough, 44.0 feet north of northwest corner of concrete dipping vat, and 29.0 feet east of board fence around corral. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with ground, 37.75 feet south of northwest corner of cattle enclosure, 1.2 feet west of fence, and 226.35 feet from station, in azimuth $249^{\circ}33'$. No. 2 projects 6 inches above ground, is 30.5 feet south of center line of dirt road from Wadsworth to dipping corral, 28.5 feet west of

center of gate, 0.4 foot north of fence line, and approximately one-fourth mile from station, in azimuth $138^{\circ}03'33''$. Station reached from Wadsworth by going east on dirt road 2.8 miles, then south 1.1 miles to fork at canal, and there turning left along canal for 1.1 miles to fork. Keep to left along canal for 0.4 mile, then right along canal 2.2 miles to gate opening into a large dipping corral on right of road, and thence to station. There is a slight jog to the north in the road east from Wadsworth. Azimuth from station of *Gulf, municipal tank*, approximately 7 miles distant, is $29^{\circ}52'15''$.

Steinmeyer (Matagorda County, F. L. Gallen, 1931).—About 6 miles southeast of Bay City, on land owned by H. Steinmeyer of Bay City. Station reached from Bay City by State road no. 58 east to limits of town, there turning right and south on a shell road known as Bucks Bayou road, and following this road south and east 4.0 miles to end of shell, and continuing south on dirt road 0.8 mile to T crossroad near Bucks Bayou at wooden bridge; turn east and follow dirt road 1.5 miles to point where it makes a right angle turn to south. Station is just south of this corner, 8.1 feet east of fence on east side of road, on a small mound between fence and ditch, 66.7 feet south of fence on south side of an east-and-west ditch, and 172 yards (paces) south of a low wooden windmill tripod. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line west of road, 146 feet south of corner post at inside of curve, 27 feet west of center line of road, and 104.0 feet from station, in azimuth $38^{\circ}05'$. No. 2 is in fence line south of road, about 30 yards east of wooden culvert over irrigation ditch, and about 0.4 mile from station, in azimuth $90^{\circ}02'57''$. *Bay City municipal tank*, distant about 6 miles, is in azimuth $125^{\circ}08'12''$ from station.

Estill (Matagorda County, F. L. Gallen, 1931).—About 14 miles east of Bay City, and 0.3 mile northwest of railroad station at Cedar Lane, on land belonging to R. S. Estill, 1 foot north of fence on north side of road, 51.2 feet north of north edge of concrete half-slab, about 200 yards northwest of Estill's store and post office, at top of slight rise, 128.6 feet west of southwest corner of tenant house, and 18 feet east of a small double peach tree, one-half of which is dead. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot east of fence around barn lot, 18.1 feet south of south face of open barn at east end, and 186.96 feet from station, in azimuth $242^{\circ}32'$; no. 2 is 1 foot east of first fence perpendicular to road west of Estill's tenant house, 10 yards (paced) northeast of fence corner, and 0.25 mile from station, in azimuth $118^{\circ}21'14''$. Azimuth from station of tip of railroad tank at Cedar Lane is $300^{\circ}44'51''$. Station reached from Bay City 1.6 miles east of State road no. 58, to junction with concrete half-slab road leading east; follow half-slab road 12.4 miles to Estill's store and station.

Pierce (Matagorda County, F. L. Gallen, 1931).—About 22 miles southeast of Bay City and 1 mile south of small village of Sargent, on land owned by A. B. Pierce, of Blessing, in northeast corner of wood lot south of a small white house and east of Caney Creek, 120.4 feet southeast of corner of house, 45.0 feet south of northeast corner of fence around wood lot, and 13.1 feet southwest of the northwest-southeast fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 5 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 4 inches above ground, is 73 feet southeast of southeast bank of an irrigation ditch, 34.5 feet southwest of center line of dirt road, 7 feet southeast of center line of driveway leading from dirt road to white house, 2.1 feet southwest of fence line, and approximately 0.2 mile from station, in azimuth $235^{\circ}38'05''$; no. 2 projects about 2 inches above ground, is about 50 feet east of east bank of irrigation ditch, 48.3 feet northeast of northeast corner of white house, 16.5 feet southwest of center line of driveway, and 178.62 feet from station, in azimuth $161^{\circ}16'$. Station is reached from end of concrete half-slab at Sargent by continuing southeast on dirt road 0.6 mile, thence southwest 0.4 mile to Negro school, thence southeast 0.9 mile to gate on right, just past a small bridge, and leading to small white house on bank of Caney Creek. Follow lane through gate to station. Azimuth mark, probably a standard reference disk in concrete, note 11 (a), is about 2.4 miles from station, in azimuth $220^{\circ}17'09''$. It is on land belonging to Mr. Sargent, 0.25 mile east of the Sargent-Pierce fence which is marked by two telephone poles on each side of road, on outside of bend in a road leading to a house about 100 yards to southeast, between the road and fence line, in northwest corner of a cultivated field, 45 feet north of

center line of road at turn, and 7 feet southeast of fence line. Mark projects about 3 inches above ground. Azimuth mark is reached from concrete half-slab at Sargent by turning northeast for 0.3 mile, thence right for 1.3 miles, and then left 1.3 miles to station.

Woosley (Brazoria County, F. L. Gallen, 1931).—About 5 miles southwest of Brazoria, and 2.4 miles west on McNeels bridge over the San Bernard River, on land owned and occupied by A. C. Woosley, in southeast corner of barn lot, 59 feet northwest of center line of dirt road, 17.15 feet north of fence on north side of road, 42.3 feet southeast of southeast corner of shed to main barn, and 101.1 feet northeast of corner post at southeast corner of Woosley front yard. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line south of road, about 12 feet west of power line pole carrying lead-in wires to Woosley's house, and 99.8 feet from station, in azimuth $335^{\circ}31'$; no. 2 is 6 feet south of south edge of ditch, in fence line at south end of wooden culvert leading to H. N. Murray's house, and 0.2 mile from station, in azimuth $58^{\circ}59'16''$.

McNeel (Brazoria County, J. A. Williams, 1852; 1931).—Five and one-half miles from the coast, about 11 miles southwest of Freeport, and 12 miles south of Brazoria, in level pasture land on the Ducroz ranch, about 0.2 mile south of east from the ranch houses, 400 yards southeast of the San Bernard River, 177 feet northwest of the center line of a public graded dirt road, one-fourth mile northeast of a cattle guard across this road, and 150 feet northwest of the right-of-way fence. In 1931 the original surface mark was gone, but the underground mark, a cast-iron cone, was recovered, as were also three 6-inch square granite posts, extending about 6 inches above the ground, north, south, and east of the station, and ranging from 2.9 to 2.6 feet from it. The old mark was replaced with new surface and underground marks, standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 2 inches above the surface of the ground, and is stamped "McNeel, 1852, 1931." In 1931 two new reference marks were established, each a standard reference disk in concrete, note 11 (a). Both are in the same pasture as the station, and each projects 6 inches above the ground. No. 1 is one-fourth mile southeast of the ranch house, 33 feet northwest of the center line of the dirt road, one-fourth mile northeast of the cattle guard, 7.5 feet northwest of the right-of-way fence, and 173.98 feet from the station, in azimuth $313^{\circ}49'$; no. 2 is about 0.15 mile southeast of the ranch house, 64.5 feet northwest of the center line of the dirt road, 0.05 mile northeast of the cattle guard, 39 feet northwest of post of gate into pasture, and approximately 0.2 mile from the station in azimuth $72^{\circ}51'50''$. The azimuth from the station of *Freeport municipal tank* is $248^{\circ}58'25''$.

Brazoria (Brazoria County, F. L. Gallen, 1931).—In the town of Brazoria, in southwesterly corner of the grounds of the Brazoria grade school, 13.7 feet northeast of westerly fence, 19.3 feet northwest of southerly fence, and 88.5 feet south of southwestern corner of school building. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line south of dirt road leading southeast under railroad, about 15 yards north of red brick chimney on northerly end of house owned and occupied by Asy Ishman, colored, about 98 yards (paced) northwest of railroad at underpass, and 0.25 mile from station, in azimuth $316^{\circ}24'58''$; no. 2 is in fence line west of road, just northeast of a small garage, 124.5 feet southwest of southwestern corner of schoolhouse, and 85.2 feet from station, in azimuth $79^{\circ}43'$. Azimuth from station of *Brazoria old courthouse steeple*, distant about one-fourth mile, is $214^{\circ}57'50''$.

Jones (Brazoria County, F. L. Gallen, 1931).—About 4 miles northwest of Freeport, on north side of shell road, route no. 36, from Freeport to Brazoria. A new road was under construction in 1931. Station is about three-fourths mile east of Jones Creek bridge, 57 feet north of center of lone oak tree standing north of road about 100 yards east of store and gas station, 99 feet north of center line of shell road, and 0.45 foot south of fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 5 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 8 inches above ground, is 174.8 feet northeast of oak tree, 139 feet north of center line of shell road, 1.3 feet south of fence line, and 144.16 feet from station, in azimuth $268^{\circ}45'$; no. 2 projects about 12 inches above ground, 1.45 feet south of picket fence around

house of Mrs. J. B. Petzold, 82.4 feet west of southeast corner of fence, 42.2 feet southwest of southwest corner of house, 8.0 feet northeast of center of 2½-inch oak tree, and approximately 450 feet from station, in azimuth $145^{\circ}18'20''$. Azimuth from station of *Freeport municipal tank*, distant approximately 5 miles, is $285^{\circ}49'49''$.

Angleton (Brazoria County, F. L. Gallen, 1931).—About 1 mile southwest of the town of Angleton, on land owned and occupied by a Mr. Jamison, 40 feet north of center line of road, 12.1 feet north of fence north of road, 157.7 feet northeast of northeast gatepost of main gate to Jamison's grounds, and 269.8 feet east of south brick pier at steps on east side of his house. Station reached from Angleton's main corner 0.5 mile west on State Road No. 58, to dirt road leading south; follow dirt road 0.7 mile to railroad, and turn down track southwest 0.1 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in right-of-way fence on north side of Gulf Coast Railroad, 32 feet south of center line of dirt road, 144 feet east of east gatepost mentioned above, and 77.5 feet from station, in azimuth $343^{\circ}15'$; no. 2 is in the southwest intersection of right-of-way and a dirt road leading south, in north right-of-way fence corner at point where power line crosses railroad, 14 yards (paced) north of north rail, and 0.2 mile from station, in azimuth $49^{\circ}55'$. Azimuth of final, *Angleton municipal tank*, distant three-fourths mile, is $207^{\circ}47'07''$.

Pharr (Brazoria County, F. L. Gallen, 1931).—About 7 miles north of Freeport, and 6.6 miles north of the Freeport-Velasco bridge, on east side of shell Highway No. 19 between Freeport and Angleton, 0.7 mile southeast of crossing of Missouri Pacific Railway, in fence line on southwest side of large pasture, 0.2 mile southeast of bend in highway, 0.15 mile northwest of concrete box culvert under road, about 300 yards southeast of a fence corner, 37 feet north east of center line of road, and 1.8 feet northeast of fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above ground, is in fence line on northeast side of large pasture, 45 feet southwest of center line of road, route 19, 0.6 foot southwest of fence, and 82.75 feet from station, in azimuth $51^{\circ}08'$; no. 2 projects 5 inches above ground, is near a fence corner and gate, on southwest side of Highway No. 19, 0.4 mile southeast of Missouri Pacific Railway crossing, on inside of bend in road, 10 feet west of center of gate to pasture, 7.2 feet east of a large stump which serves as a gatepost, 4.4 feet east of a triple fence corner, and approximately 0.2 mile from station, in azimuth $146^{\circ}38'51''$. Azimuth from station of *Hoskins Mound, Freeport Sulphur Co., stack*, distant 8 miles, is $220^{\circ}54'38''$. Station reached from Freeport by main shell Highway No. 19 toward Angleton, 6.6 miles from bridge to station.

Hoskins (Brazoria County, F. L. Gallen, 1931).—About 12 miles east of Angleton and 9 miles southeast of Danbury, on highest point of Hoskins Mound, on land leased by the Freeport Sulphur Co., 162.3 feet south and across the road from a black wood tank marked "Property of T. T. Co.", 43.5 feet south of center line of road, and 43.0 feet west of center line of narrow shell road leading south. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 12 inches above surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 5 inches above ground, is 25 feet south of center line of dirt road, 111.3 feet northwest of a 3-inch cap on sulphur well no. 110K and approximately 0.2 mile from station, in azimuth $246^{\circ}30'34''$; no. 2 projects about 8 inches above ground, is 35 feet north of center line of road, on line to black wood tank, 78.8 feet south of tank, and 83.46 feet from station, in azimuth $158^{\circ}47'$. Azimuth of *Hoskins Mound, Freeport Sulphur Co., west tank*, distant one-half mile, is $79^{\circ}27'49''$.

Danbury (Brazoria County, F. L. Gallen, 1931).—About 15 miles southwest of Alvin, in the village of Danbury, in the northeast corner of the Catholic Church grounds, northwest of State Road No. 58, 18.1 feet north of fence parallel to road, 24.4 feet west of fence perpendicular to road, and 20.75 feet east of northeast corner of church. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 32 feet southeast of center line of road, approximately on line of a gas-pipe fence perpendicular to road, and 83.2 feet from station, in azimuth $294^{\circ}44'$; no. 2 is 30 feet east of center line of road at entrance to a weed-

grown narrow alley, at corner of barn lot northeast of Highway Garage, opposite fifth power line pole southwest of church, and 0.15 mile from station, in azimuth $35^{\circ}59'17''$. Azimuth from station to *Hoskins Mound, Freeport Sulphur Co., stack*, distant 9 miles, is $315^{\circ}39'09''$.

Liverpool (Brazoria County, F. L. Gallen, 1931).—About 8 miles south of Alvin on State Road No. 58, in the small village of Liverpool, on north side of road, 20 feet west of board fence around cattle pen, 72.7 feet northeast of north end of first concrete culvert east of corner of post office, and 65 feet north of center line of State Road No. 58. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete note 11 (a). No. 1 is 24 feet southwest of south end of concrete culvert, 27 feet south of center line of road, and 113.05 feet from station, in azimuth $356^{\circ}49'$; no. 2 is about 50 yards east of railroad station at Liverpool, at corner of right-of-way fence southwest of railroad crossing, about 18 yards (paced) southwest of U.S.G.S. B.M. 053, 1918, in west abutment of concrete culvert south of railroad, and approximately 0.2 mile from station, in azimuth $58^{\circ}50'18''$. Azimuth from station of base of staff on cupola, Liverpool School, distant about three-fourths mile is $343^{\circ}01'02''$.

Hughes (Brazoria County, F. L. Gallen, 1931; 1933).—About 8 miles south of Alta Loma, 100 yards east of Hall's Bayou, 170 feet north of the Hughes ranch house, on a slight mound in pasture land belonging to Joe H. Hughes of Houston, 167.8 feet north of north corner of bungalow which is main ranch house, 61.9 feet east of north corner of wooden front yard fence, and 61.6 feet northwest of wire fence of pasture. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 6 inches above surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 10 inches above surface, is in fence corner northeast of bungalow, 20 feet southwest of gate of lane to ranch yard, 109 feet from east corner and 97 feet from north corner of bungalow, 1.9 feet north of fence corner, and 81.12 feet from station, in azimuth $21^{\circ}36'$; no. 2 projects 10 inches above ground, is 2.3 miles south of entrance to ranch property, 0.35 mile northwest of ranch house, 36.7 feet southwest of center line of road from entrance to house, and 0.35 mile from station, in azimuth $146^{\circ}13'$. County line monument no. 22 is one-half mile from station, in azimuth $180^{\circ}47'52''$. Station reached from Alta Loma by shell road which goes south by post office and depot; follow in general south direction 5.2 miles from railroad in Alta Loma, to end of shell at a farm house, and continue on 0.2 mile to gate on left leading into the Hughes ranch. Follow this road (lane) 2.5 miles to ranch buildings, which are in a prominent clump of trees.

Alvin (Brazoria County, F. L. Gallen, 1931).—About 1 mile south of the town of Alvin, in an acute angle between roads at the junction known as Five Points, on opposite side of road from yellow house, in east fence line of dirt road leading south, 98.5 feet south of junction, 21.0 feet east of center line of dirt road, 38.7 feet west by south of center line of shell road bearing to east, 16.58 feet west by south of west fence line of shell road, 13.85 feet south of end of fence post on east side of dirt road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 8 inches above surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on east side of shell road, 68.0 feet southeast of junction of roads, 42.5 feet east of center line of shell road, 7.8 feet south of center of gate to house, 1.05 feet northwest of fence around house, and 66.19 feet from station in azimuth $230^{\circ}38'$. It projects 2 inches above ground. No. 2 is on east side of shell road, in telephone post line, 22.5 feet east of center line of shell road, 2.0 feet west of fence line, 16.7 feet north of northwest corner of fence around large field, and about 0.2 mile from station, in azimuth $337^{\circ}45'53''$. It projects 3 inches above ground.

Alta Loma (Galveston County, F. L. Gallen, 1931).—About 10 miles southeast of Alvin, and 7 miles south of Dickinson, in the northwest corner of school yard which is in southwest part of town of Alta Loma, 0.25 mile south of railway crossing, one-half mile west of Gulf, Colorado & Santa Fe Railway station Alta Loma, 43 feet east of center line of shell road, 209.1 feet from northeast corner of school building, 142.5 feet from its northwest corner, and 17.3 feet east of a wire fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above surface, is in the northwest corner of a cultivated field, about one-half mile west of railway station, one-fourth mile north of schoolhouse, 130 feet south of main line tracks of the Gulf, Colorado & Santa Fe, 28 feet east of center line of shell road, 4 feet west of

small cedar, 3 feet southeast of fence corner, and 65.03 feet from station, in azimuth $75^{\circ}28'$. No. 2 projects 5 inches above ground, is on west side of shell road, 0.25 mile south of crossing one-half mile west of railway station, in a fence line on east side of garden, 184 feet northwest of northwest corner of school building, 20 feet west of center line of road and 0.25 mile from station, in azimuth $179^{\circ}17'01''$. Azimuth from station to *Galveston Water & Power Co., tallest stack*, is $266^{\circ}29'43''$.

Dickinson (Galveston County, F. L. Gallen, 1931).—About $2\frac{1}{2}$ miles northwest of the town of Dickinson, 2 miles southeast of League City, on west side of the Galveston-Houston Highway, United States route no. 75, on land belonging to Mrs. Tony Emmett of Dickinson, 0.25 mile southeast of a three-span slab culvert, in north corner of front yard of a farm tenant house, 51 feet southwest of center line of paved highway, 40.5 feet from east corner of house, 33.0 feet from north corner, and 21 feet south of fence corner in east corner of garden. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 5 inches above ground, is about $2\frac{1}{2}$ miles northwest of town of Dickinson, on northeast side of highway, in a fence corner, east of a three-span slab culvert, 20.3 feet northwest of a property corner stake, 1.5 feet southwest of a line of power-line poles, 57.6 feet from the north end and 50.7 feet from the south end of the northeast rail of the culvert, and 0.25 mile from station, in azimuth $145^{\circ}24'20''$. No. 2 projects 6 inches above ground, is about $2\frac{1}{2}$ miles northwest of Dickinson, on northeast side of highway, about 200 feet south of a farmhouse, in property line fence, 250 feet southeast of lane to house, 36 feet northeast of center line of paved highway, and 96.81 feet from station, in azimuth $256^{\circ}34'$. Azimuth from station of *Dickinson Ice and Fuel Co., tank*, distant 2 miles, $321^{\circ}59'02''$.

Eignus (Galveston-Brazoria Counties, F. L. Gallen, 1931).—About 5 miles southeast of Pearland, a village on the Houston-Alvin road, and 1.3 miles west of Friendswood store, on land belonging to C. A. Eignus, of Friendswood. Station is on the south side of League City-Pearland shell road, 5 feet south of fence, 26 feet south of center line of road, 401.3 feet southeast of wooden culvert over irrigation ditch at southeast corner of large fig orchard, about 80 yards northwest of tenant house, and 0.9 mile west of the crossroads at fig cannery just west of Friendswood store. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 2 feet south of fence on north side of road, 21 feet north of center line of road, and 96.3 feet from station, in azimuth $268^{\circ}33'$; no. 2 is 25 feet southeast of east post of gate to Brookside ranch, 25 feet north of center line of road, and 0.2 mile from station, in azimuth $121^{\circ}42'17''$. A county monument is 843.6 feet from station, in azimuth $191^{\circ}59'29''$. Station reached from Houston by way of State road no. 35 to junction with shell road leading southeast to League City 0.8 mile southeast of Pearland, and 3.5 miles along shell road to Brookside ranch.

Peden (Harris County, F. L. Gallen, 1931).—About 7 miles south of La Porte, 2 miles west of Seabrook, on north side of Clear Lake, in southeast corner of pasture to west of white bungalow occupied by W. C. Harvin, 56.6 feet west of gate leading to bungalow, 51.9 feet north of center line of macadam road, 23.55 feet west of fence separating lawn and pasture, 14.34 feet north of the east-and-west fence line, and 14.65 feet northwest of a cedar stump. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 12 inches above ground, is 22.0 feet south of center line of road, 88.0 feet east of east face of east concrete gate post, 0.90 foot north of fence line, and 77.82 feet from station, in azimuth $337^{\circ}27'$; no. 2 projects about 5 inches above ground, is on the north side of curve, 31.0 feet northeast of center line of road, 0.70 foot southwest of fence line, and approximately 0.2 mile from station, in azimuth $98^{\circ}07'51''$.

Genoa (Harris County, F. L. Gallen, 1931).—About 13 miles southeast of Houston, in the village of Genoa, on United States route no. 75, in northwest corner of Genoa school grounds, 30 feet southeast of northwest corner of school yard fence, 14.5 feet south of fence, and 108.9 feet northwest of the northwest corner of brick schoolhouse. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of front fence around Baptist church, 41.3 feet southwest of southwest corner of church, 30

feet north of center line of shell road, and 210.9 feet from station, in azimuth $110^{\circ}17'$; no. 2 is 16 yards (paced) west of west edge of concrete road (route 75), 13 yards (paced) south of concrete culvert on west side of road and directly across from white telephone pole no. 14 on railroad right-of-way, east of route no. 75, and approximately one-fourth mile from station, in azimuth $202^{\circ}14'43''$. Station reached from Houston via United States route no. 75 to Genoa railroad station, thence by shell road west one-fourth mile to school. Azimuth of black tank in city of South Houston is $141^{\circ}01'52''$.

Shell (Harris County, F. L. Gallen, 1931).—About 14 miles east of Houston, and 8 miles northwest of La Porte, 40.2 feet south of center line of Houston-La Porte paved road, 0.3 mile west of Deer Park railway station, south of the Shell refinery, west of the short length of fence running north and south at west end of widened right-of-way of railroad, 23.6 feet west by south of the northwest corner of fence, 15.0 feet north of right-of-way fence, and 62.3 feet north of north rail of railroad. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects about 2 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects about 2 inches above ground, 31.0 feet south of center line of road, 77.45 feet north of north rail of railroad, 1.40 feet south of fence separating highway and railroad right-of-way, and 88.99 feet from station, in azimuth $261^{\circ}53'$. No. 2 projects about 5 inches above ground, south of highway where a side road turns north to the Shell refinery, 28.4 feet south of center line of highway, 49.15 feet north of north rail of railroad, 0.75 foot north of right-of-way fence, 1.05 feet east of telephone post no. E 18, and 0.35 mile from station, in azimuth $91^{\circ}21'$.

Morgan Point 2 (Harris County, F. L. Gallen, 1931).—About 2 miles northeast of La Porte, on Morgan Point, on west side of the channel, south side of San Jacinto Bay, on top of a prominent ridge, 100 feet west of end of ridge, and 31 feet south of edge of bluff, in yard of a summer cottage used by a Mr. Bathea of San Antonio, and on land in charge of the Houston Land & Trust Co. of Houston. Station is about 100 feet northeast of house of Mrs. Rice, 75 feet northeast of the Bathea cottage, 31.2 feet west of water tank north of cottage, 31.6 feet south of fence on bluff edge, and 32.5 feet east of property line fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is on the same property as station, near east end of ridge, at northwest corner of grape arbor, 44.47 feet north of northeast corner of cottage, 15 feet south of fence on bluff bank, 36.8 feet west of a concrete fence corner post, and 90.38 feet from station, in azimuth $252^{\circ}19'$. No. 2 projects 4 inches above ground, is in fence line between cottage and house of Mrs. Rice, 105 feet south of bluff edge, 1 foot east of property line, 63.9 feet from southeast corner and 56.6 feet from northeast corner of Rice house, and 81.03 feet from station, in azimuth $355^{\circ}09'$. Azimuth mark is standard reference disk in concrete, note 11 (a). It extends 2 inches above surface, is on the west shore of Galveston Bay, in subdivision known as Red Bluff Shores, which is about 4 miles south of La Porte, on a vacant lot owned by Mrs. Looston of California, 325 feet southeast of southeast corner of Dr. Red's summer house, on the prolongation of the lane to Dr. Red's house and garage, about 700 feet southeast of brick gate posts, 26 feet west of edge of bluff, 29.3 feet southwest of fence corner post, and about 4 miles from station, in azimuth $1^{\circ}46'46''$. Station *Morgan Point (U.S.E.)* (see description thereof) is 7.245 meters (23.77 feet) from station in azimuth $329^{\circ}20'$. It is marked by standard disk station mark in concrete, note 1 (a). Azimuth from station of *Goose Creek, municipal tank*, distant about $3\frac{1}{2}$ miles, is $197^{\circ}06'38''$.

San Jacinto (Harris County, F. L. Gallen, 1931).—About 8 miles south of Crosby, and 6 miles northwest of Goose Creek, on the east bank of the San Jacinto River, on west side of road, about 0.2 mile north of crossroads just east of bridge over San Jacinto River, on land belonging to the Trinity Portland Cement Co. of Houston, just south of a shell road leading to some houses on the bank of the river, 31.8 feet west of fence on west of road, 141.2 feet southeast of southeast corner of house belonging to the William Goedeke estate, and 54.7 feet northeast of a double oak tree. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on east side of road, 16 feet east of ditch on east side of road, 10 feet south of oak tree which is partly decayed on its north-west side, and 123.0 feet from station, in azimuth $309^{\circ}17'$; no. 2 is 12 feet east of ditch on east side of road, 44.3 feet southwest of southwest corner of first small

bungalow north of cross roads, 60.7 feet northwest of northwest corner of small white house with three windows on west side, and 0.1 mile from station, in azimuth $9^{\circ}45'23''$. Station reached from United States route no. 90, 1 mile south from Crosby, by paved road south about 7 miles to station.

Davis (U.S.E.) (Harris County, U.S.E., 1900; 1931).—Established by United States Engineers in 1900, on east shore of Scott Bay, on old Davis place near Midway Landing, about $1\frac{1}{4}$ miles northwest of Humble refinery at Baytown, three-fourth mile north of Humble docks on Houston ship channel, and 200 yards southwest of paved road leading northwest from Baytown to Houston. Land is owned and occupied by Mr. Davis. Station is about 40 yards south of his house, on a shell hill, 50 yards from bay. Original surface mark was United States Engineers standard cast-iron station mark projecting 3 inches. Original underground mark was brass plug in sandstone block about 2 feet below surface. Mark found in 1930 was 3-inch pipe with cap missing. In 1931 old surface and underground marks removed and station re-marked with standard disk station marks in concrete, notes 1 (a) and 7 (a). Originally two United States Engineers standard cast-iron reference marks were established, projecting 3 inches above surface of ground, 100 feet distant, one in azimuth $65^{\circ}24'$, other in azimuth $102^{\circ}09'$. In 1931 original reference marks not recovered, but one old Coast and Geodetic Survey standard reference disk in 6-inch concrete post was recovered 72.75 feet from station, in azimuth $176^{\circ}07'$, and two new standard reference disks were set in concrete, note 11 (a). No. 1 is 30 feet west of concrete pier under window in west end of the Davis house, and 219.2 feet from station, in azimuth $178^{\circ}21'$; no. 2 is 3 feet west of fence on west side of street, 45 feet west of center line of road, on range with east end of large signboard on bank of channel and first short steel transmission tower on south side of channel, and approximately one-fourth mile from station, in azimuth $265^{\circ}47'56''$.

Beazley (Chambers County, F. L. Gallen, 1931; 1932).—About 11 miles south of Barbers Hill, 6 miles southeast of Goose Creek, 550 feet west of bluff bank on west shore of Galveston Bay, near the new Tri-City Beach resort, 0.3 mile south of Tri-City Hotel, on land belonging to John Beazley, of Houston. Station is on east side of an uncultivated field, just south of a thicket of wild fruit trees, 148 meters (486 feet) east of Camp Sterling road, 66 feet west of center line of shell road which turns south from the Goose Creek road just north of the hotel and goes south to Camp Sterling road. A fence line with cattle guard at road is 430 feet south of station, which is on a slight mound. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 10 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on west side of subdivision, in a row of recently planted trees, about 0.3 mile south of hotel, 450 feet west of bluff of bay, 430 feet north of cattle guard and fence line, 75 feet north of oblique turn in shell road, 23.5 feet east of center line of shell road, and 89.20 feet from station, in azimuth $255^{\circ}04'$. It projects 3 inches above surface. No. 2 is about 0.6 mile south of the Tri-City Hotel, on west side of shell road that goes to Cedar Point, 450 feet west of bluff on bay, 1,000 feet east of fence line, 0.15 mile north of turn in shell road where lane to house continues south, 29 feet west of center line of shell road, 100 feet south of future street on east side, and approximately 0.3 mile from station, in azimuth $8^{\circ}45'32''$. Mark extends 10 inches above ground. Station reached from town of Goose Creek by paved road to Pelly, thence east on shell road 7 miles to the Tri-City Beach Hotel on Galveston Bay. Azimuth from station of *Anahuac, courthouse dome*, is $244^{\circ}09'40''$.

Barber (Chambers County, F. L. Gallen, 1931).—About 15 miles south of Liberty, 1 mile south of Barbers Hill or Mont Belvieu, in south edge of oil field on land said to belong to Chambers County Agricultural Association. Station is on small hummock, 95 feet north of edge of salt-water ditch, and 578.6 feet northeast of outlet valve on northeast tank of group of four storage tanks belonging to Sun Pipe Line Co. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reached from United States route no. 90 at Dayton by following dirt road south 13 miles to Barbers Hill; or from United States route no. 90, 1 mile south of Crosby, by gravel and shell road to Barbers Hill. At village of Barbers Hill or Mont Belvieu follow main street 1.2 miles south to shell and dirt road leading east just south of small white house with white rail fence on east side of road; follow this road 0.4 mile east to a dirt road leading south to Sun Oil Co.'s steam plant; drive to end of this road in front of steam plant, turn right around plant and across open ground to station. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on a small

hummock, 53 feet north of edge of salt-water ditch, and 145.95 feet from station, in azimuth $255^{\circ}22'$; no. 2 is 66 yards southwest of intersection of road leading to Sun Oil Co.'s plant, 28 feet north of center line of road running northeast and southwest, and approximately one-fourth of a mile from station, in azimuth $123^{\circ}19'54''$.

Scherer (Chambers County, F. L. Gallen, 1931; 1932).—About 4 miles south of Anahuac, on eastern shore of Galveston Bay, 0.4 mile west of the Anahuac-Eagle shell road, on land owned by Mrs. A. L. Scherer, 250 feet northwest of her large farmhouse, in northeast corner of pasture lying to west of house, 118 feet east of edge of bluff, 49.15 feet west of north of a galvanized iron garage, 38.64 feet west of board fence of barnyard at end of lane, and 13.66 feet south of pasture fence. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 4 inches above ground, is about one-half mile northeast of Mrs. Scherer's house, in northeast corner of large pasture and on west side of the Anahuac-Eagle road, 0.2 mile north of where it turns from south to east, and lane to house goes west, 23 feet west of center line of road, 1.48 feet west of fence line, 16.40 feet south of fence corner where fence and road make an oblique turn, and approximately one-half mile from station, in azimuth $230^{\circ}43'32''$. No. 2 projects 4 inches above ground, is north of Mrs. Scherer's house, in fence line on north side of lane to house and barnyard, 102.3 feet north of northwest corner of house, 44.0 feet northeast of northeast corner of galvanized iron garage, 29.4 feet west of garden fence and 227.98 feet from station, in azimuth $265^{\circ}35'$. No. 3 projects 4 inches above ground, is about 240 feet west of southwest corner of Mrs. Scherer's house, 118 feet west of the bluff bank, in pasture land, 143.5 feet south of pasture fence, 10.7 feet north of a 1-foot cottonwood tree, and 129.87 feet from station, in azimuth $358^{\circ}36'$. Station reached from Anahuac by shell road to Eagle, south 4 miles to where road turns east and the lane to Mrs. Scherer's house goes west. Go west through several gates to large farmhouse and to station 250 feet to northwest of house.

Collins (Chambers County, F. L. Gallen, 1931).—About 15 miles southeast of Liberty and 6 miles north of Anahuac, on west side of road leading from Liberty to Wallisville, on land owned and occupied by W. W. Collins, in a small pasture lot south of Collins' house, which is a white house with brick chimney at north end. A small group of fruit trees stands just south of house. Station is 127 feet slightly north of west of the southwest corner of a small white house with green trim on east side of road, 63 feet west of center line of road, and 33.5 feet west of fence on west side of road. From Liberty leave United States route no. 90 on east side of town and follow shell road south 16.3 miles to Collins' house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is 1 foot below the surface of the ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 30 feet east of center line of road, 109 feet east of northeast corner of chimney on north end of Collins' house, and 109.5 feet from station, in azimuth $330^{\circ}38'$; no. 2 is 39 feet east of center line of road, 37.2 feet southwest of the southwest corner of house on east side of road, and 585.3 feet from station, in azimuth $229^{\circ}04'38''$.

Moon (Chambers County, F. L. Gallen, 1931).—About 5 miles southeast of Anahuac, on east side of shell road leading to Smith Point, on land owned by Lane and Bonier of Houston, on what is locally known as the old Moon place, on a slight mound 50 feet east of center line of road, and 80.5 feet northwest of a blazed tree with triple trunk which is on a second small mound. This mound is 0.8 mile south of section line fence east of a gate on west side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 1 foot south of section line fence (above), 102 feet east of road, 62 feet east of fence on east side of road, and 0.85 mile from station, in azimuth $178^{\circ}56'51''$; no. 2 is in fence line west of road, 30 feet west of center line of road, and 80.68 feet from station in azimuth $76^{\circ}38'$. Azimuth to Anahuac, courthouse dome, distant 5 miles, is $138^{\circ}23'51''$. Station reached from United States route no. 90 at Devers by following State Road No. 61 south about 15 miles to junction with State Road No. 125 at a filling station, thence south 4.7 miles on shell and dirt roads to station.

McBride (Chambers County, F. L. Gallen, 1931).—About 11 miles south of Devers, a village on United States route no. 90, 8 miles northeast of town of Anahuac, and 1.2 miles north of Hankamer crossroads, on west side of route no.

61, in front of the house of A. F. McBride, on land owned by him, 128 feet east of center of front of his house, 86.3 feet east of front yard gate, 149.3 feet south of fence post at southeast corner of field, 61 feet north of garden fence, 52 feet west of center line of shell highway, and in a level grassy plot. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 12 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 extends 10 inches above ground, is 1.6 miles north of Hankamer crossroads, on the west side of right-of-way of route no. 61, on west side of ditch, 2,000 feet north of McBride's house, 100 feet northeast of a couple of lumber shacks, 101.5 feet northwest of northwest corner of front yard of small house, 33.5 feet west of center line of road, and approximately 2,000 feet from station, in azimuth $190^{\circ}27'17''$. No. 2 projects 10 inches above ground, is 1.2 miles north of Hankamer crossroads, on east side of route no. 61, in front of Guy Frezia's bungalow, 100 feet south of west of the southwest corner of Frezia's house, 73.2 feet west of southwest fence corner of front yard, 130.5 feet south of southwest fence corner of garden plot, 43 feet east of center line of road and 119.29 feet from station, in azimuth $318^{\circ}18'$. Azimuth from station of white silo, one-half mile distant, is $65^{\circ}28'57''$. Station reached from route no. 90 at Devers, by route no. 61 south about 11 miles to station.

Winnie south base (Chambers County, F. L. Gallen, 1931).—About 7 miles south of Winnie, 5 miles south of Stowell, and 1,125 feet north of the Seabreeze railway station, on the right-of-way of the Gulf, Colorado & Santa Fe Railway, west of the tracks and east of the road between Stowell and High Island, 55 feet east of center line of road, 21.6 feet east of right-of-way fence, 25.81 feet west of center of west rail of tracks at a point 22.0 feet north of north end of switch points. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 4 inches above surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 8 inches above ground, is on the east side of the railway right-of-way, 90 feet south of the Seabreeze railway station, near a gate leading to a large house one-fourth mile to southeast, 180 feet east of center line of road between Stowell and High Island, 45.8 feet east of east rail of the Gulf, Colorado & Santa Fe Railway track, 1 foot west of wire fence, 4 feet north of gate post, and 1,250 feet from station, in azimuth $354^{\circ}25'49''$. No. 2 projects 8 inches above ground, is 27 feet west of center line of the Stowell-High Island Road, about 1,225 feet north of Seabreeze railway station, 106.6 feet west of west rail and west of a switch signal on railway, and 82.04 feet from station, in azimuth $78^{\circ}05'$. Station reached from the village of Stowell which is on route no. 125, by county road south towards High Island, 4.6 miles to station.

Winnie north base (Chambers County, F. L. Gallen, 1931).—About 22 miles southwest of Beaumont and 4 miles north of the village of Winnie, in the south fence line of an unused road, 295 yards (paced) east of section line fence corner, and on the prolongation of the west rail of the Santa Fe railroad tangent at Winnie. Reached from Beaumont by State Road No. 125 about 28 miles to Winnie. At first curve in road west of railroad crossing at Winnie turn north on dim dirt road and follow it $3\frac{1}{2}$ miles to its end. It is practically unused for the last $1\frac{1}{2}$ miles, and impassable for trucks in wet weather. Turn east on unused section line road and go about 300 yards to station. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in north fence line of unused road, and 57.19 feet from station, in azimuth $184^{\circ}47'$. No. 2 is in west fence line at end of road, 310 yards (paced) from station, in azimuth $87^{\circ}18'44''$. Azimuth from station of green vertical bar in third and highest window in west end of house at clump of trees, distant $1\frac{1}{2}$ miles, is $296^{\circ}22'36''$.

Riedel (Jefferson County, F. L. Gallen, 1931).—About 7 miles southeast of Hampshire, on highest point of hill known as Big Hill, on property of F. W. Riedel, approximately 350 feet south of house, 263 feet south of northeast corner of fence line, 133.3 feet north of southeast corner of fence line, and 0.73 foot west of fence line. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with ground 82.9 feet south by east of the southeast corner of porch of Riedel's house, 50.7 feet east of cattle gate, 0.77 foot south of fence line bordering road leading to house, and 310.45 feet from station, in azimuth $188^{\circ}38'$; no. 2 is flush with ground, just outside of southwest corner of fence around large field, 2.40 feet east of projection of north-and-south fence line, 0.70 foot south of east-and-west fence

line, and approximately 0.5 mile from station, in azimuth $104^{\circ}29'04''$. Reached from Hampshire by following route no. 125 east for 2 miles to point where it turns north and there turning south on a graded dirt road; follow main traveled road 2.2 miles and then turn east; go 1.8 miles, and turn south and follow the traveled road to its termination at a wooden gate and cattle guard. From here take road that appears most traveled over at the time through the field to Big Hill about $1\frac{1}{2}$ miles southwest of the entrance.

Burrell (Jefferson County, F. L. Gallen, 1931).—About 16 miles southwest of Beaumont, 4 miles southeast of village of Fannett, in pasture land owned by J. J. Burrell, on largest of a number of mounds in the field, it being about 50 feet in diameter and 4 feet above general elevation of the land, and composed of sandy loam; there are three 18-inch trees on the mound. Station is 0.7 mile south of lower shell road leading east from Fannett, 156 feet west of dirt road which leads south from shell road and enters a large woods about one-half mile south of station. Station is 35 feet west of tree with old blaze, 30.7 feet south of another tree, and 17.8 feet southeast of largest tree of the three, marked with a triangular blaze. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 extends 8 inches above surface, is in southwest corner of intersection of dirt road with shell road 3.0 miles south of east of Highway No. 125 at Fannett, in extreme northeast corner of the pasture in which station is located, about 250 feet northeast of a shanty, 164 feet east of fence post marking northeast corner of front yard, 44 feet south of center line of shell road, 39 feet west of center line of dirt road, and 0.7 mile from station, in azimuth $189^{\circ}06'05''$. No. 2 is on west side of center of pasture, 0.7 mile south of shell road, 36 feet east of dirt road, east of hummock on which station is located, and 192.12 feet from station, in azimuth $281^{\circ}42'$. Station reached from route no. 125 at Fannett by shell road leading east and southeast, south of the railway station, at a filling station, and past the brick school-house, 0.6 mile to a fork in road; along right-hand fork 2.4 miles to dirt road leading south near shanty, and along dirt road south 0.7 mile to station.

Gilbert (Jefferson County, F. L. Gallen, 1931).—About 18 miles southwest of Beaumont, and 8 miles west of Fannett, on land owned by the Gilbert Pasture & Cattle Co., Gilbert Building, Beaumont. Reached from Beaumont by State Road No. 125, southwest to Fannett; there take shell road leading west about 0.2 mile north of railroad station and just north of section houses, follow it west for 7.8 miles to T-road running north and south, which intersection is just south of a bridge over an irrigation ditch. Station is in northeast intersection of T-road, 111 feet east of center line of road, 69.3 feet east of fence east of road, 73.05 feet north of northeast corner of screened porch of ranch house, and 20.4 feet south of fence on north side of house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in fence line west of road, 141.05 feet from station, in azimuth $84^{\circ}31'$; no. 2 is in corner of section-line fence, 1.9 feet southeast of corner post, 32.4 feet south of center line of east-and-west road, and 0.5 mile from station, in azimuth $177^{\circ}46'59''$.

Fannett (Jefferson County, F. L. Gallen, 1931).—About 12 miles southwest of Beaumont, and 1.4 miles northeast of the village of Fannett, on west side of State Highway No. 125, on east side of the Gulf, Colorado & Santa Fe Railway, and on north side of a side road going west from highway and crossing tracks. Station is in fence line between right-of-way of above side road and right-of-way of railroad, 34.07 feet southeast of east rail of single-track line where it goes through cattle guard, 45 feet northwest of center line of highway, 38.5 feet northeast of center line of shell side road, and 13 feet northwest of a fence corner post. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 8 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 3 inches above ground, is in fence line between west side of pasture and east right-of-way line of Highway No. 125, 56 feet northeast of the center line of the side road which goes west from the highway, 1.4 miles northeast of village of Fannett, 101.9 feet southeast of east rail of railway, 25 feet southeast of center line of highway, 1.21 feet southeast of fence line, and 70.77 feet from station, in azimuth $287^{\circ}21'$. No. 2 projects 10 inches above ground, is in fence line between railway right-of-way on west and highway on east, 0.35 mile southwest of where side road crosses tracks 1.4 miles northeast of Fannett, 46.05 feet southeast of east rail of railway, 32 feet northwest of center line of highway, 1.45 feet west of fence line, and 0.35 mile

from station, in azimuth $31^{\circ}32'14''$. Azimuth from station of center of front of school building at Fannett, distant $1\frac{1}{2}$ miles, is $25^{\circ}22'24''$. Station reached from Beaumont by State Highway No. 125 about 12 miles southwest to a road which goes west from highway at point 1.4 miles northeast of village of Fannett. A mail box here is marked "W. S. Clubb."

China (Jefferson County, P. A. Smith, 1931).—About 15 miles east of Beaumont, 0.8 mile west of the village of China, 16.1 meters (53 feet) north of Highway No. 90, 3.6 meters (12 feet) north of fence line, 26.0 meters (85 feet) south of south rail of Texas & New Orleans Railroad, on the railroad right-of-way, and 125.5 meters (412 feet) east by north from the northeast corner of bridge on highway, over drainage ditch. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 8 meters (26 feet) south of gravel road, at fence corner where railroad right-of-way widens to north, 200 meters (656 feet) from station, in azimuth $235^{\circ}35'.8$; no. 2 is 7 meters (23 feet) north of gravel road, about 15 meters (49 feet) east of bridge, at east end of board fence, and 85.96 meters (282.0 feet) from station, in azimuth $136^{\circ}53'$.

Amelia (Jefferson County, P. A. Smith, 1931).—About 7 miles, airline, west of Beaumont, about 6 miles, airline, east of China, 2 miles west and 1 mile south by road from Amelia, a station on the Texas & New Orleans Railroad, at the crossing of Highway No. 90, on the A. Savery survey, on land belonging to the Josey-Miller Co. of Beaumont. Station is 1 foot east of a wire fence, and 7 meters (23 feet) west of center line of dim shell road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Two reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 7 meters (23 feet) east of center line of dim shell road, and 38.08 meters (124.9 feet) from station, in azimuth $203^{\circ}28'$; no. 2 is 7 meters (23 feet) east of center line of dim shell road, and 64.62 meters (212.0 feet) from station, in azimuth $345^{\circ}29'$. Amelia eccentric no. 3 is a standard reference disk set in concrete in center of top of a 4-inch galvanized iron pipe, top of pipe being 1 foot above surface. It is 3.037 meters (9.96 feet) from station, in azimuth $242^{\circ}14'$.

Beaumont (Jefferson County, F. L. Gallen, 1931).—In the city of Beaumont, on the north side of Washington Boulevard, just west of the crossing of the Beaumont and Fort Arthur branch of the Southern Pacific, and on railroad property, 62.82 feet north of the center line of the boulevard, and 62.82 feet west of west rail. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Three reference marks were set, standard reference disks in concrete, note 11 (a). No. 1 is 51.80 feet south of center line of boulevard, 60.95 feet west of west rail, and 140.91 feet from station, in azimuth $319^{\circ}51'$; no. 2 is in the yard of house no. 1995, Washington Boulevard, 34.75 feet northeast of house corner, 42.60 feet south of center line of boulevard, and 259.23 feet from station, in azimuth $65^{\circ}33'$; no. 3 is 20.2 feet east of road running parallel to railroad and to station, and is 0.3 mile from station in azimuth $151^{\circ}08'41''$.

Hebert (Jefferson County, F. L. Gallen, 1931).—About 7 miles south of Beaumont and 5 miles west of south of the Spindletop oil field, in the fence line between the right-of-way of a road and west side of large pasture belonging to Mr. L. M. Hebert, who operates a large dairy about 3 miles northeast of station. Station is on east side of only shell road in vicinity, 34.0 feet east of center line of road, 0.5 mile north of Hillebrant Bayou canal, 0.2 mile south of a bungalow on west side of road, 300 feet northeast of wooden shanty, just east of a lane which leads west from main highway across cattle guard to Beaumont Launch Club, and on a small mound 73.2 feet northeast of a fence corner which is on west side of road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark projects 4 inches above surface. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 12 inches above surface, is about 0.2 mile south of group of houses, between the main shell road and canal where road first turns from south to southwest, in right-of-way of road, 45 feet southeast of center line of road at middle of bend 38.5 feet west of fence line, 20 feet north of canal bank (Hillebrant Bayou), and about one-half mile from station, in azimuth $359^{\circ}18'20''$. No. 2 projects 12 inches above ground, is in the fence line on east side of pasture and west side of right-of-way of shell road, 50 feet north of lane to Beaumont Launch Club at cattle guards, 70.5 feet north of fence corner, 26 feet west of

For notes in regard to marking of stations see p. 154.

center line of road, 0.8 foot east of fence line, and 66.35 feet from station, in azimuth $115^{\circ}36'$. The following azimuths are from station: *Beaumont, San Jacinto Life Insurance Building, clock tower spire*, distant 9 miles, $183^{\circ}18'44''$; *Port Neches, black tank*, distant 10 miles, $249^{\circ}23'18''$; *Port Arthur, Gulf Refining Co., tallest stack*, $301^{\circ}32'07''$. To reach station from Beaumont go south and southeast on Highland Avenue, where it leaves Fort Arthur Avenue in southeast part of town, 2.5 miles to Spindletop oil field; in center of field take shell road going west from railway and the West Port Arthur road, southwest and south 5.9 miles to station.

Stephenson (Orange County, F. L. Gallen, 1931).—About 6 miles east of Beaumont, and 2 miles south of Vidor, a small settlement on United States route no. 90, on land owned and occupied by G. E. Stephenson, in an open space, just north of a wood pile, 84 feet east of center line of road, 31 feet northwest of a forked post-oak tree at northwest corner of chicken house. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in an old abandoned fence line north of road, just south of curve, 30 feet northwest of wooden culvert, and 0.2 mile from station, in azimuth $1^{\circ}39'17''$; no. 2 is 20 feet west of center line of road, and 127.9 feet from station, in azimuth $126^{\circ}26'$. Station reached by United States route no. 90 to Vidor, about 7 miles east of Beaumont; there take shell road leading south at filling station and go south 2 miles to fork, the road being dirt south of railroad. Take left fork 1.2 miles to Stephenson's house.

Doornbos (Jefferson County, F. L. Gallen, 1931; 1933).—About 5 miles north of Port Arthur (7.3 miles by road from business district), and 3 miles southeast of Nederland, in pasture belonging to estate of Jake Doornbos of Nederland, 80.1 meters (263 feet) south of center line of Highway No. 8, 74.35 feet east of center of east rail of single track branch of Kansas City Southern Railway to Port Neches, at end of short lane leading south from highway about 130 feet east of railway crossing, 48.55 feet northeast of power line pole, and 37.1 feet west of fence corner. Surface and underground marks are standard station disks in concrete, notes 1 (a) and 7 (a). Upper mark is flush with surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is flush with ground, 0.4 mile west of railway crossing, 46 feet south of center line of highway, 29.3 feet south of center of south rail of concrete box culvert, 6.4 feet southeast of fence corner, and 0.45 mile from station in azimuth $133^{\circ}43'12''$; no. 2 is 5 inches above surface, 150 feet east of railway crossing, 49 feet south of center line of highway, 28.4 feet southeast of gate to short lane, 13.6 feet south of fence corner, 1.5 feet west of fence line, and 182.07 feet from station in azimuth $221^{\circ}22'$. *P. T. station no. 63M (U.S.G.S.)* (see description thereof) is 113.886 meters (373.64 feet) from station in azimuth $162^{\circ}20'08''$. *Spur (U.S.E.)* (see description thereof) is 43.861 meters (143.90 feet) from station in azimuth $18^{\circ}08'$. South 3.75 feet from *P. T. station no. 63M (U.S.G.S.)* is an iron pipe similar to *Spur (U.S.E.)* except that it is loose in ground. Following distances and azimuths are from station: *Port Neches, black tank*, 3 miles, $176^{\circ}07'01''$; and *Port Arthur, Gulf Refining Co., tallest stack*, $5\frac{1}{2}$ miles, $11^{\circ}45'08''$.

Stark (Orange County, F. L. Gallen, 1931).—Nine and one-tenth miles by United States route no. 90 northwest of Orange, on land belonging to W. H. Stark, of Orange, in small wood lot east of tenant house occupied by Stephen Mott, opposite main gate to large fig orchard, and 48.9 feet south of edge of concrete road. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 27 feet south of edge of concrete, 15 feet south of small concrete culvert under road leading south to graveyard, and 0.2 mile from station, in azimuth $261^{\circ}22'59''$; no. 2 is on north side of road at west post of main gate to fig orchard, and 99.7 feet from station, in azimuth $149^{\circ}45'$.

Dunn (Orange County, F. L. Gallen, 1931; 1933).—About 9 miles southwest of Orange, and 9 miles northeast of Port Arthur, on the west side of route no. 87, where it begins the $1\frac{1}{2}$ miles filled approach to the bridge and ferry on north side of Neches River. Station is on a mound at north end of Government canal which parallels the road across the marsh, on south side of a large grove of trees subdivided into homesites, about 800 feet east of a large privately owned artificial lake, in picnic grounds belonging to Bob Berwick of Orange, 172.5 feet south of the southeast corner of "The Princess" night club, 99 feet west of center line of route no. 87, and 100.5 feet north of the fence line bounding the marsh. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a).

Upper mark projects 5 inches above surface of ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is on east side of route no. 87, about 400 feet north of where it begins the filled approach across the marsh, on west side of a grove of trees, on property marked "Homesite No. 12", 121.5 feet east of the northeast corner of the roadhouse, 66.2 feet north of a fence corner, 28.5 feet east of center line of route no. 87, and 237.00 feet from station, in azimuth $211^{\circ}37'$; no. 2 projects 6 inches above ground, is about 600 feet east of route no. 87, about 200 feet south of where it enters the marsh, 102 feet north of the northwest corner of a house, 70.8 feet west of the northwest corner of garage, 3 feet north of telephone pole, and approximately 700 feet from station, in azimuth $302^{\circ}42'26''$. Azimuth from station of *Port Neches, black tank*, distant $6\frac{1}{2}$ miles, $78^{\circ}11'02''$, and of *Port Arthur, Gulf Refining Co., tallest stack*, 12 miles, $36^{\circ}26'20''$. Station reached from Orange by State highway, route no. 87, west 7 miles to the Orange oil field, thence south on same highway 4.8 miles to "The Princess" night club and station site.

Reese (Orange County, F. L. Gallen, 1931).—About 8 miles north of Orange on land belonging to Mr. Duhig of Lake Charles, La., in southwest corner of small cleared field east of road and opposite house occupied by George Revia. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is at southeast corner of yard around brown bungalow, and 100.3 feet from station, in azimuth $85^{\circ}07'$; no. 2 is 24 feet east of center line of road, 13 feet southeast of 18-inch pine tree standing about 4 feet east of bank of ditch, and 298 yards (paced) from station, in azimuth $170^{\circ}15'45''$. A 2-foot sweetgum tree with double top stands about 12 feet north of the pine tree. U.S.G.S. P.T. station no. 4M, 1926, is slightly south of west from station. Reached from Orange by route no. 87 for 5.3 miles to fork, then by right hand fork 2.8 miles to station.

Orange (Orange County, F. L. Gallen, 1931).—In city of Orange, in courthouse grounds, 51.60 feet north of northwest corner of jail, 63.15 feet northwest of northeast corner of jail, and 43.9 feet east of curbing on east side of Border Street. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark is flush with ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is in corner of sidewalk at northwest corner of intersection of Border and Henderson Streets, 3.24 feet west of east edge of west curb of Border Street and 11.8 feet southeast of southeast corner of house no. 118 Border Street, and 160.12 feet from station in azimuth $31^{\circ}47'$. It projects 2 inches above sidewalk. No. 2 is flush with surface on east side of cement walk in front of no. 203 Ninth Street, 25 feet west of center line of street, 39.87 feet southeast of northeast corner of that house, 31.27 feet east of southeast corner of same house, and approximately 0.15 mile from station, in azimuth $141^{\circ}13'14''$.

Vinton (Calcasieu Parish, La., F. L. Gallen, 1931).—About 5 miles northwest of Vinton, on land owned by Dr. Ford of Vinton, in the northeast corner of a T-intersection of a dirt road with State route 121, 62 feet north of center line of dirt road, and 64 feet east of center line of State road. Reached from United States route 90 at its junction with State route 121, north 5.5 miles along State road to dirt road leading east along section line at station site. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 25 feet west of center line of road, and 96.0 feet from station, in azimuth $79^{\circ}12'$; no. 2 is 25 feet west of center line of road, 6 feet north of power line pole $\frac{A2}{32}$ and 0.3 mile from station, in azimuth $176^{\circ}33'33''$.

Ged (Calcasieu Parish, La., F. L. Gallen, 1931).—About 4 miles south of Vinton, 1 mile southwest of center of Ged oil field, on a low knoll, about 800 feet southwest of schoolhouse, and 750 feet southwest of pond, on land owned by Henry Gray of Lake Charles. Station is 100 feet north of west from a frame house, 45 feet northwest of small garage with galvanized iron roof, in a wire fence line, 40 feet north of a pig lot, and 30 feet south of gate to lane leading to house one-fourth mile to west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Surface mark projects 6 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 8 inches above ground, is about 500 feet south of pond, 400 feet east of white schoolhouse, east of fork in dirt road leading south from main gravel road, 156 feet south of gravel road which skirts the pond on the south 89.5 feet south of front yard fence of small house, 71 feet east of middle of three 20-

inch trees in a row, 33.5 feet east of center line of dirt road, and approximately 0.2 mile from station, in azimuth $236^{\circ}06'08''$. No. 2 projects 12 inches above the ground, is about one-fourth mile west of schoolhouse, 400 feet south of pond, 150 feet north of east from house, 175 feet north of lane to house, in southeast corner of garden, 3.20 feet west of fence corner and gate post, 1 foot south of fence, and 234.32 feet from station, in azimuth $136^{\circ}23'$. Azimuth from station of red brick chimney on east side of white house, distant three-fourths mile, $119^{\circ}23'45''$. Station reached from United States route 90 at Vinton along main street to south of town, thence 3 miles southwest on main gravel road to Ged oil field. From center of field take main gravel road south, then west on south side of pond three-fourths mile to dirt road leading south about 100 yards east of schoolhouse. Follow this road south, bear to west at forks, one-fourth mile to top of small knoll and station site.

Supplementary points

Oak (Aransas County, J. C. Ganger, 1911; 1931).—About 4 miles north of Rockport, $1\frac{1}{2}$ miles north of the old Fulton mansion, on the west shore of Aransas Bay, on the highest point of Lookout Hill, the highest dune in the vicinity. Dune is covered with scrub brush. Reached by shell road which leads to Live Oak Point, 4.3 miles north from Rockport to point opposite station. This point is opposite 4 pickets in bay connected by boards at their tops, and is 80 yards north of a boat dock. There is a small recess in bank west of road. Station is about 50 yards west of road, and about 30 feet higher. Marked underground by bottle (or spike) set in concrete, and at surface by standard disk station mark in concrete post, 2 feet in diameter and $2\frac{1}{2}$ feet deep. Reference mark no. 1 is bottle set in concrete $2\frac{1}{2}$ feet below surface, and above it another bottle set in concrete post about 18 inches in diameter. It is approximately 8 feet lower than the station mark, on southeast slope of hill, 2 meters (7 feet) northwest of small live oak tree, and 14.11 meters (46.3 feet) from station in azimuth $319^{\circ}52'$. Reference mark no. 2 is bottle set in concrete $2\frac{1}{2}$ feet below surface, and above it a standard reference disk in concrete post. It is on west slope of hill, 10 feet below crest, and 21.97 meters (72.1 feet) from station in azimuth $80^{\circ}59'$. In 1931 station mark recovered, but reference marks not found, probably being covered with sand.

Ballou House (Aransas County, J. C. Ganger, 1911; 1931).—In 1911 this was the first house southeast from Lamar Church. It was owned and occupied by Mr. Taylor, and is a two-story masonry building with lookout on top of main roof. Station is center of lookout as determined by the intersection of the diagonals drawn through the centers of the four corner posts. In 1931 it was reported that the house had been remodeled, but that the rafters had not been disturbed.

Austin (Refugio County, J. C. Ganger, 1911; 1931).—On west shore of Hynes Bay, $2\frac{1}{4}$ miles from Sharps Point, and about 500 meters (1,640 feet) northward from Mr. Austin's house, in 1911 the first and most conspicuous house on the west shore of the bay when approaching from the south. In 1931 Stark's ranch had been built up around the station, and the mark was $8\frac{1}{2}$ feet northeast of northeast corner of the shed closest to the bluff, 4 paces from the bluff bank, and 40 meters (131 feet) northeast of Stark's house. It was marked by a standard disk station mark in concrete post $1\frac{1}{2}$ feet in diameter and $2\frac{1}{2}$ feet long. Reference mark is a bottle in concrete set 30 inches below surface of ground, above which is a standard reference disk in concrete post. It is 27.08 meters (88.8 feet) from station in azimuth $47^{\circ}23'$. In 1931 it was found in rear of house, in chicken yard, under a coop, and was reported as having been disturbed, the arrow on the disk pointing to the southeast instead of toward the station. In 1931 connection by traverse was made with station *Austwell* (see description thereof) distant 125.2 meters (411 feet) in azimuth $94^{\circ}52'34''$.

Terry reference mark (Calhoun County, J. C. Ganger, 1911; 1931).—About 2 miles west of Seadrift, on north shore of San Antonio Bay, on the Binewald ranch. In 1930 the station mark was reported destroyed by erosion, but the reference mark was recovered in good condition, and its position determined with the Gulf Coast arc. It is 20 paces inland from bluff bank, 23 paces northwest of a shallow gully, 4 paces southeast of a prickly pear, and 120 meters (394 feet) northwest of a wire fence terminating at a low point of land extending into the bay. It is reached from Seadrift by road northwest 0.7 mile to ranch road, keeping straight ahead where the shell road turns to right, and following dirt road west 0.8 mile to the Binewald ranch house, thence going about 1 mile west, across

country, the way winding among mesquite thickets and prickly pear to station, which is in a flat area covered with scattered mesquites. The original marks, a bottle in concrete above which is a disk in concrete, were replaced in 1931 with standard disk station marks in concrete, notes 1 (a) and 7 (a). The upper mark is flush with ground, and the disk is stamped: Terry R.M., 1911; 1931. Two reference marks set in 1931 are standard reference disks in concrete, note 11 (a). No. 1 is 557.9 feet from station in azimuth $196^{\circ}59'32''$; no. 2, 147.7 feet, $274^{\circ}25'$.

Swan reference mark (Calhoun County, J. C. Ganger, 1911; 1931).—About $1\frac{1}{2}$ miles south of Seadrift, on the extremity of Swan Point, on the east shore of San Antonio Bay. In 1930 the 1911 station mark was found broken and lying at water's edge. Both reference marks of 1911 were recovered in good condition, and R.M. no. 1 used as a supplementary station, and connected with the Gulf Coast arc. It was 66.325 meters (217.6 feet) from the original station, in azimuth $266^{\circ}05'$. It was marked originally by bottles set in concrete for both surface and underground marks. In 1931 a standard disk station mark was set in the upper mass of concrete and stamped: Swan R.M., 1911–1931. This mark is now 33 feet from edge of bank, on a slight knoll, 270 paces south of east from the extremity of Swan Point, and 80 yards west of last large bed of prickly pear on the point. R.M. no. 2 of 1911 marked underground by a bottle in concrete and at the surface by a standard tablet in concrete, stamped: Swan R.M. no. 1, 1911, 1931. It is now 8 feet north from edge of bank, 30 paces east of a 4- by 4-inch post standing at water's edge, and 121.1 feet from station in azimuth $87^{\circ}35'$. Two new reference marks were established in 1931, probably standard reference disks in concrete. No. 2 is on neck of point, 0.1 mile (speedometer) from station in azimuth $261^{\circ}08'37''$. No. 3 is on a slightly raised mound, 199.4 feet from station in azimuth $232^{\circ}11'$. In 1930 station was reached from Seadrift by the Old Settlement Road east and south 1.6 miles to end at cattle guard; pass through guard and follow sand trail 0.2 mile to fork; take right-hand fork 0.3 mile to windmill and proceed thence in a southwesterly direction 1.1 miles to station.

Well Point 2 (Matagorda County, W. B. Fairfield, 1906; 1931).—On Well Point, on the northern shore of Matagorda Bay, 93 meters (305 feet) west of extremity of point, 8 meters (26 feet) north of south bluff bank, and 47 meters (154 feet) southwest of (normal to) northeast bluff bank. Station originally marked by bottle 3 feet below surface, about which was a 4-inch tile pipe, 2 feet long, flange down, filled with and encased in concrete, and a nail to mark center. Top inscribed: C.G.S. 1906. In 1931 station remarked with standard disk station mark set in mass of concrete. Old reference marks were concrete posts 8 inches square and 2 feet long, projecting 4 inches above ground, marked with arrow and spike. One is 12.989 meters (42.61 feet) from station in azimuth $176^{\circ}22'$; the other, 13.635 meters (44.73 feet), $84^{\circ}34'$. They were not searched for in 1931 when two new reference marks were established, standard reference disks in concrete, note 11 (a). No. 1 is 53.75 feet from station in azimuth $195^{\circ}19'$; no. 2 is just north of a large clump of mesquite, and 0.35 mile (speedometer) from station in azimuth $110^{\circ}27'56''$. A United States Engineers mark was found 300.0 feet from station in azimuth $112^{\circ}10'32''$. It is a bronze marker set in concrete in 6-inch tile projecting about 5 inches above the ground, and surrounded by a circular mass of concrete; it is about 100 yards north of the bluff bank.

Well Point (Calhoun County, S. A. Gilbert, 1856; 1931).—About 2 kilometers west of the extremity of Well Point. Reached from Palacios by State road no. 58 to Camp Hulen, thence north three-fourths mile, and west across Turtle Bay 5 miles to section corner, thence south 2 miles to section corner 0.1 mile east of Sartwell Brothers' ranch. Continue south on a little used section line road 3.0 miles to beach. Station is at foot of this road, 7 yards north of top of bank, 72 yards south of vacant house, 80 yards southwest of a shed at artesian well, and 61.0 feet southwest of section of railroad rail set in concrete. This rail extends about 2 feet above the ground, and marks the boundary between Calhoun and Matagorda Counties. Station originally marked by bottle 3 feet below the surface, and at the surface by spike in mass of concrete, inscribed: C.G.S., 1855–1906. In 1931 a standard disk station mark was set in the mass of concrete. Old reference marks were an iron reference mark 1.82 meters (6.0 feet) from station, and a concrete post, 10 inches square and 2 feet long, 13.39 meters (43.9 feet) from station. New reference marks were set in 1931, standard reference disks in concrete, note 11 (a). No. 1 is in fence line on east side of dim road, and 0.25 mile (speedometer) from station in azimuth $182^{\circ}39'46''$; no. 2 is in fence line on east side of road, 88.0 feet from station in azimuth $255^{\circ}45'$. The azimuth of the county boundary monument (above) is $237^{\circ}12'$.

County boundary monument (Matagorda-Jackson-Calhoun Counties, F. L. Gallen, 1931).—An iron pipe 2 inches in diameter with section of railroad rail in the middle of a dim north-and-south section line road, projecting about 6 inches above ground. Station is 1.0 mile from corner of Sartwelle's ranch, and about 100 yards south of circular concrete troughs east and west of road. Center of pipe was determined.

Kenner (Matagorda County, J. S. Williams, 1853; 1931).—Originally described as being on the Kenner sugar plantation, 150 meters (492 feet) north of a bend in Caney Creek, and 300 meters (984 feet), S. 36° E. of the sugar house. It is in an open cultivated field, 657.092 meters (2,155.81 feet) in azimuth $139^{\circ}15'20''$ from station *Pierce* (see description thereof). To reach take same road as for *Pierce* to the negro schoolhouse, thence southeast 0.5 mile to road leading to southwest, thence southwest 0.1 mile to gate on left into turn row between fields. Station is 105 yards southeast of fence south of road, and 27 paces northeast of turn row, which is depressed. As recovered in 1930 a 3-inch cedar stub marked the point, the underground mark, a cast-iron cone $3\frac{1}{2}$ feet below the surface not being searched for. Three reference marks, marble blocks each 3 feet from the station, and to the north, south, and east thereof, were recovered, but out of plumb and somewhat battered. In 1931 a standard disk station mark was set in concrete 12 inches below surface of ground, and two new reference marks were set consisting of standard reference disks in concrete projecting 6 inches above the ground. No. 1 is in north corner of cultivated field northeast of station, 41 feet southeast of center line of the northeast-southwest road, 32 feet southwest of the northwest-southeast road, 12.5 feet southeast of the north corner of fence, and 1.6 feet southwest of the fence line, and 777.34 feet from station in azimuth $217^{\circ}00'50''$; no. 2 is 3.0 feet southeast of the northeast-southwest fence line, 33 feet southeast of the center of the road, and 25 feet northeast of the center of the turn row leading into the field about 0.1 mile southwest of the north corner of the field, and 320.67 feet from station in azimuth $136^{\circ}48'$.

West 2 (U.S.E.) (Brazoria County, U.S. Engineers, 1897; F. L. Gallen, 1931).—On the west side of the Brazos River, about 1 mile from its mouth, and 315 meters (1,033 feet) south of the last house on the south side of Quintana. In 1931 described as being about 4.5 miles by road southeast of the center of town of Freeport and 0.6 mile east of the Intercoastal Canal, in sandy pasture land, on west side of Quintana Beach, about $1\frac{1}{2}$ miles south of sulphur loading dock, one-fourth mile southwest of the end of the shell road at group of houses which are one-half mile southeast of bridge over canal, and 375 feet east of a small frame house. Originally marked at the surface by a United States Engineers standard reference mark used as a station mark. In 1931 this was replaced with a standard disk station mark in concrete, note 1 (a), projecting 5 inches above the ground, the disk being stamped: West 2, 1897, 1912, 1931. It was centered with the old station mark, and over the old underground mark which was in good condition and was not disturbed. Character of underground mark not recorded. The anchor posts of a former wooden signal remain in position, 9 feet from the station, forming a triangle around it. These are 8-inch, solid, creosoted posts. Two reference marks set in 1931, standard reference disks in concrete, note 11 (a), project 10 inches above the surface of the ground. No. 1 is near end of shell road at forks 0.55 mile southeast of steel bridge over canal, 114.6 feet southeast of southeast corner of large frame house, 33 feet northeast of center line of shell road, 10.85 feet northeast of a 3-inch square property stake, and approximately 0.25 mile from station in azimuth $224^{\circ}13'56''$; no. 2 is about one-fourth mile southwest of end of shell road at forks 0.55 mile southeast of bridge, 200 feet northeast of small frame house, and 184.63 feet from station in azimuth $144^{\circ}13'$. Azimuth of *Brazos River Light-house*, distant 1 mile, is $187^{\circ}28'34''$. Station reached from point 1 block southeast of Tarpon Inn in Freeport by State route 36 southwest 1.5 miles, thence southeast 2.8 miles to forks, and 0.25 mile southwest to station.

Well (U.S.E.) (Brazoria County, U.S. Engineers, 1912; F. L. Gallen, 1931).—Near mouth of Brazos River and reached in 1931 as follows: From Freeport cross Brazos River bridge; at east end of bridge take right-hand shell road to Velasco railroad station, and follow shell road across ferry over canal to its end, opposite Coast Guard station at right. Take extreme left-hand trail (dim) and follow it northeast about three-fourths mile to station, which is about one-fourth mile from beach, one-fourth mile northeast of white house surrounded by cabins, 27 yards northeast of an artesian well, and about 70 yards southeast of a natural road, opposite small mud flats made by the well overflow. The original mark, a standard disk in a stovepipe set in concrete, was replaced in 1931 with surface and

underground marks consisting of standard disk station marks set in concrete, notes 1 (a) and 7 (a). In 1931, two reference marks were established, standard reference disks in concrete, note 11 (a). No. 1 is on a slight ridge south of dim trail, 508 yards from station in azimuth $222^{\circ}32'05''$; no. 2 is 112.3 feet from station in azimuth $314^{\circ}22'$. In 1912 the following azimuths were determined from the station: Artesian well, distant 26.2 meters (86 feet), $45^{\circ}35'$; railroad water tank at Velasco, $94^{\circ}12'$; Hudgins house, chimney, $132^{\circ}57'$.

Life (Galveston County, I. W. Winston, 1912; 1933).—On Galveston Island, on the west shore of West Bay, 20 miles southwest of Galveston, 4 miles northeast of the end of the island, on a point 400 yards north of the San Luis Coast Guard Station boathouse, nearly on line with the side of that boathouse, and 20 paces from the shore. Reached from the foot of 61st Street, Galveston, southwest down the beach 19.5 miles to the Coast Guard station; turn in west of the station and follow trail northwest about 0.7 mile to the boathouse on the bay side of the island; then turn right through gap in fence just northwest of boathouse and follow shore 400 yards to station. Station is 17 paces east of first scrub mesquite bush near shore that is northeast of boathouse, and is surrounded by a small trench forming a 12-foot square. Station mark is standard disk station mark in 4-inch tile pipe filled with and set in concrete. Reference mark is standard disk set in manner similar to station mark, its top is about 3 inches below surface, and it is 13.63 meters (44.7 feet) from station in azimuth $314^{\circ}38'$. The azimuth from the station of the San Luis Coast Guard Station cupola, distant about three-fourths mile, is $340^{\circ}38'09''$. A small mound was thrown up just beyond the reference mark, and stake left by the mark.

Snake (Galveston County, I. Winston, 1912; 1931).—About 16 miles southwest of Galveston, on the southeast shore of West Bay, on the bay side of Galveston Island, on land belonging to S. E. Kemper of Galveston, and 1 mile northwest of house surrounded by salt-cedar hedge. It is on low shell point, opposite the south end of Snake Island. In 1930 it was reached from the foot of 61st Street, Galveston, southwest along the beach 15.4 miles to a drive leading north through heavy locked gate to Kemper's hunting lodge. Kemper's name is on gate, which is about 100 yards from the beach. Follow road past lodge and west to gate out of enclosure, and along sand trail with line of telephone poles southwest down the island; go 200 yards, then bear to right on trail leading to shooting box, about 1.5 miles from front gate. Station is 24.54 meters (80.5 feet), in azimuth $289^{\circ}12'$ from southeast corner of shooting box. End of trail near bay has been fixed with old bricks and sheets of tarred roofing. In 1930 station and reference marks were recovered in good condition. Station mark is a standard disk in top of a 4-inch stoneware pipe filled with sand set in concrete. Reference mark is similar to station mark, except that a standard reference disk was used. It is 16.07 meters (52.7 feet) from station in azimuth $337^{\circ}13'$. Both marks are just under the surface of the marsh. Station mark was surrounded by a small ring of bricks, and a 2- by 4-inch stake was set 1 foot distant in line to Kemper's lodge. Other azimuths from station are (1912): House, west gable, $242^{\circ}28'$; house in grove, west gable, $289^{\circ}16'$; life-saving station, cupola, $40^{\circ}28'$; and (1930): Shooting box on Snake Island, $178^{\circ}07'$; railroad rail post just off shore, $249^{\circ}39'$; Kemper's lodge, windmill, $285^{\circ}28'$; windmill, $335^{\circ}56'$.

Fort Crockett aerial beacon (Aero, 1931) (Galveston County, F. L. Gallen, 1931; 1933).—Near the western city limits of Galveston, at the Fort Crockett flying field, 372 meters (1,220 feet) south of the S Road (Ave. S), and 860 meters (2,822 feet) west along the S Road from 61st Street. Mark is revolving beacon light on top of 65-foot red painted metal tower.

Noffke (Harris County, F. L. Gallen, 1931).—About 14 miles east of Houston, and 5 miles west of the San Jacinto River bridge, on north side of Houston-Goose Creek paved road, on old Noffke estate, on land now belonging to Mrs. Dorothy Canion of Houston, on top of a rise about 10 feet high left when road was excavated, 24.5 feet north of fence at top of clay bank. Reached from Houston via Houston-Goose Creek paved road about 14 miles to concrete bridge over Carpenters Bayou, thence 0.2 mile east to station on first knoll east of bayou. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 24 feet north of wire fence, 37 feet south of south edge of concrete pavement, on slight rise between road and fence, and 0.2 mile from station in azimuth $275^{\circ}30'16''$; no. 2 is 57 feet south of south edge of concrete pavement, in fence line south of road, and 143.0 feet from station in azimuth $4^{\circ}35'$.

Cullinan (Harris County, F. L. Gallen, 1931).—About 9 miles west of San Jacinto River bridge, and 9 miles east of Houston, on north side of the Houston-Goose Creek paved road, on land belonging to J. S. Cullinan of Houston. Station is about 1.2 miles west of Green Bayou bridge, 0.7 mile west of an old saw mill, 65 feet north of north edge of concrete pavement, 15.7 feet northeast of a 1-foot gum tree, north of a point about midway between telephone pole no. 170 and next one to west. Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Reference marks are standard reference disks in concrete, note 11 (a). No. 1 is 30 feet (approximately) south of south edge of pavement, at southwest intersection of dim road leading south into woods, about 20 feet northeast of first telephone pole west of pole no. 180-E 46, and 0.3 mile from station in azimuth $271^{\circ}44'19''$; no. 2 is 34.8 feet south of south edge of pavement, between telephone pole no. 170 and next pole to west, and 132.95 feet from station in azimuth $331^{\circ}31'$.

Buffalo (Harris County, F. L. Gallen, 1931).—About 5 miles east of Harrisburg, 1 mile north of Pasadena, on south bank of Houston Ship Channel, 0.9 mile north of Houston-La Porte paved road, 0.1 mile west of road leading to ferry and west of a refinery, on same knoll as monument commemorating capture of Santa Anna, on land belonging to J. S. Cullinan of Houston. To reach from Pasadena, go 0.8 mile on road leading north just west of business district, thence west 0.1 mile along lane leading west to large frame house on hill. Station is 200 feet north of northeast corner of house, 162.5 feet north of fence line, 70.5 feet north of granite memorial tablet, and 41 feet south of edge of bluff of Buffalo Bayou (Houston Ship Channel). Surface and underground marks are standard disk station marks in concrete, notes 1 (a) and 7 (a). Upper mark extends 4 inches above ground. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 extends 12 inches above surface, is on same property as station, 201 feet south of bank of bayou, 95.5 feet southeast of monument, 63 feet northeast of northeast corner of house, 1.2 feet north of fence line, and 161.27 feet from station in azimuth $336^{\circ}25'$; no. 2 extends 3 inches above ground, is near group of farm buildings about $\frac{1}{4}$ mile southwest of monument, 71 feet southeast of southeast corner of concrete pump house, 22.5 feet south of southeast corner of barn, 1 foot east of fence line just north of gate, and 0.25 mile from station in azimuth $47^{\circ}40'55''$. Azimuth from station of Texas Oil Co. tank, distant $1\frac{1}{2}$ miles, is $143^{\circ}21'34''$.

Port (Harris County, F. L. Gallen, 1931).—Near center of highest part of Houston Port Commission concrete grain elevator, 1.615 meters (5.30 feet) in azimuth $331^{\circ}35'$ from metal flagpole near center of roof. Flagpole is hydrographic and topographic signal *Grain* (see description thereof). Station marked by a standard disk station mark set into concrete roof. Roof has a coating of tar and gravel and mark may be covered to a depth of one-half to 1 inch. Reference mark is standard reference disk set flush in top step of elevator motor house, on east edge of roof, 7.280 meters (23.88 feet) from station in azimuth $207^{\circ}33'$. The grain elevator is east of the turning basin in the Harrisburg industrial district, and is best reached from Main Street, Houston, via Franklin Street and Navigation Boulevard.

Grain (Harris County, J. A. Bond, 1931).—The center of the base of the 4-inch metal flagpole on top of the highest part of the Houston City Grain Elevator (Houston Port Commission grain elevator) at the turning basin at Harrisburg. It is 1.615 meters (5.30 feet) in azimuth $151^{\circ}35'$ from station *Port* (see description thereof).

Maid (Harris County, F. L. Gallen, 1931).—In the eastern part of the Harrisburg industrial district of Houston, on the highest superstructure of the concrete grain elevator of the American Maid Flour Mills. The roof of this structure is about 30 by 60 feet, of concrete covered with tar, with a 1-foot coping. On it are two dust collectors and an iron flagpole. Station was marked by a standard disk station mark set flush in roof, 6.24 meters (20.5 feet) south of north edge of coping, 1.43 meters (4.7 feet) west of east coping, and 4.310 meters (14.14 feet) in azimuth $225^{\circ}32'$ from center of base of flagpole. Center of base of flagpole is hydrographic and topographic station *Flour* (see description thereof). Reference mark no. 1 is a threaded iron bolt built into roof and projecting about 2 inches. An X-mark was chiseled into head of bolt; it is 1.35 meters (4.4 feet) east of west coping, 8.13 meters (26.7 feet) south of north coping, 2.34 meters (7.7 feet) from center of base of pole, and 6.49 meters (21.3 feet) from station in azimuth $54^{\circ}20'$. Reference mark no. 2 is a $\frac{1}{2}$ -inch iron bolt with nut on it projecting about 2 inches above roof into which it is built. An X has been chiseled into head. It is 5.04 meters (16.5 feet) south of north coping, 1.35 meters

(4.4 feet) east of west coping, 3.89 meters (12.8 feet) from center of base of pole, and 6.38 meters (20.9 feet) from station in azimuth $82^{\circ}03'$. The American Maid Flour Mill is on south side of ship channel, about 1 mile east of main business street in Harrisburg.

Flour (Harris County, J. A. Bond, 1931).—The center of the 2-inch flagpole on the highest part of the American Maid Flour Mills at Manchester, about 190 meters (623 feet) to the south of the Houston Ship Channel, and 4.310 meters (14.14 feet) in azimuth $45^{\circ}32'$ from station *Maid* (see description thereof).

Pasadena (Harris County, J. A. Bond, 1931).—The apex of the conical roof of the water tank at Pasadena. Tank is located on the northwest corner of the intersection of Fifth and Shaver Streets, directly in rear of city fire station.

Chim (Harris County, J. A. Bond, 1931).—Station is center of tall concrete stack, the easternmost of two similar stacks at the Shell petroleum refinery, about one-half mile south of Buffalo Bayou. The stacks are about 26 meters (85 feet) apart, and about 200 meters (656 feet) west of a hard-surfaced road leading from Deer Park to Buffalo Bayou.

Morgan Point (U.S.E.) (Harris County, U.S.E., 1901; 1911; F. L. Gallen, 1931).—About 2 miles northeast of La Porte, in prolongation of north side of paved road that leads northeast from La Porte and turns south about 400 feet west of station. Station is 7.245 meters (23.77 feet) in azimuth $329^{\circ}20'$, from station *Morgan Point 2*. Station is 100 feet northeast of Mrs. Rice's house, 68.9 feet northwest of cottage, 55.3 feet south of fence line on edge of bluff, 34.8 feet east of fence of Rice property. The United States Engineers station mark was recovered in good condition in 1931, but the reference marks could not be recovered. The iron mark of the Engineers was replaced with a standard disk station mark in concrete, note 1 (a), set flush with surface, and disk stamped: Morgan Point U.S.E., 1901, 1911. For further description, see *Morgan Point 2*.

Cedar Point (U.S.E.) (Chambers County, F. L. Gallen, 1931; 1932).—Established by United States Engineers in 1900 on Cedar Point (Umbrella Point), on north shore of Galveston Bay, on land owned in 1932 by Professor Gates, principal of San Jacinto High School in Houston. Reached in 1930 from station *Beazley* (see description thereof) by going south 0.9 mile to end of shell road, thence 0.5 mile on dirt road to gate on left opening into new shell drive, with many "No trespassing" signs around, thence along shell drive 0.5 mile to its end, near two-story white beach house. Station is about 250 yards north of house, 80 meters (262 feet) northwest of bluff bank of bay, 44.72 meters (146.7 feet) north of northeast corner of Professor Gates' house, 20.45 meters (67.1 feet) northeast by east from west property line fence (8-foot wire), 50.9 meters (167 feet) southeast from center line of shell drive parallel to Camp Sterling Road, 10.28 meters (33.7 feet) southwest by west from east property line fence, 26.70 meters (87.6 feet) west of northeast corner of double garage, and about 30 yards southeast of small tree. Station originally marked by brass plug in small sandstone block, 2 feet below surface, and above this a United States Engineers standard cast-iron mark projecting 3 inches above ground. Reference marks were United States Engineers standard cast-iron marks projecting 3 inches above ground, placed 100 feet from station, one to east and other in azimuth $215^{\circ}38'$. In 1930 station and reference marks recovered and remains of old tripod also in evidence. It was then reported that ground was being graded for improvements, and the future of station uncertain. In 1931 station was remarked with standard disk station mark in concrete block which projected 3 inches above surface, and one reference mark was recovered. In 1932 station was recovered but reference marks were not found.

Robinsons Bayou (U.S.E.) (Chambers County, F. L. Gallen, 1931; 1933).—Established by the United States Engineers in 1900. About 10 miles north of west from the town of High Island, on the south side of the north shore of East Bay, one-half mile in a direct line northeast from the mouth of Robinsons Bayou, on a shell mound which extends east-and-west and is about 500 feet long and 100 feet wide. This mound is the only one in the vicinity, and forms the east bank of the bayou where it makes a bend. Station is in the approximate center of the mound, 53 feet south of the bank of the bayou, on highest part of mound, about 4 feet above the surrounding land. The original surface mark, a standard United States Engineers cast-iron mark, was replaced in 1931 with a standard disk station mark set in top of a concrete post 12 inches in diameter, 2.5 feet long, and projecting 10 inches above the ground. It rests on the old subsurface mark, a concrete block with brass plug in center. The original reference marks were not found in 1931 and two new ones were set, consisting of standard reference disks in concrete posts 5 inches in diameter, 2 feet deep, projecting 2 inches above the ground. No. 1

is 100 feet northeast of east end of mound, 87 feet northeast of solid 6-inch post extending 7 feet above ground, 30 feet southeast of bayou bank, and 252.16 feet (slope) from station in azimuth $249^{\circ}06'$; no. 2 is about 80 feet west of center of mound, 44 feet south of bayou bank, and 84.02 feet from station in azimuth $98^{\circ}12'$. Azimuth from station of top of southwest end of long line of trees distant about 8 miles is 316° .

Highland 2 (Chambers County, S. C. McCorkle, 1872; 1933).—Identical with United States Engineer station High Island 2, about 7 miles northeast of Rollover, $4\frac{1}{2}$ miles east of the mouth of East Bay Bayou, about 30 feet above mean low water and about 250 meters (820 feet) northeast of a small frame house occupied by E. Meyrig. In 1931 revised description reads: After crossing railroad at High Island follow main traveled road southward to a right-angle turn to west at R. W. Barrows' store; here turn east on narrow shell road and go to first turn to south. A small green-trimmed white house stands on east side of road about 300 yards south of turn. Station is east of point about midway between curve and house, in southeast corner of vacant pasture lot, on a small sandy knoll, about 275 yards southwest of group of small red storage tanks with two larger silver-colored ones among them, 250 yards east of a road, 171 feet east of a north-and-south fence, and 45 feet north of an east-and-west fence. Original underground marks are two earthenware pyramids, 6 inches on edge, with letters U.S.C.S. cut into their faces, one being 3 feet below the surface, the other 2 feet. Later a standard United States Engineers station mark was placed above the pyramids. In 1931 a new surface mark was put in, being a standard disk station mark in concrete, note 1 (a). Underground marks not changed. There are two United States Engineers reference marks, each 100 feet from the station; their azimuths therefrom being $60^{\circ}09'$ and $115^{\circ}58'$. Reference marks set in 1931 are standard reference disks in concrete, note 11 (a). No. 1 is 1.5 feet east of east end of R. W. Barrows' store, 4.5 feet north of southeast corner, 29 feet west of center line of road and approximately 0.4 mile from station in azimuth $80^{\circ}49'20''$; no. 2 is in second fence line south of station, 21 feet east of its intersection with a north-and-south fence, and 335.3 feet from station in azimuth $2^{\circ}18'$.

Northwest Bend (Chambers County, G. Bradford, 1861; 1933).—One mile northwest of High Island, on west side and about 6 miles from mouth of East Bay Bayou, near second bend above High Island, about $1\frac{1}{2}$ miles northwest of High Island railroad station, on marshy ground, 240 meters (787 feet) southeast to north bank of Intracoastal Canal, 50 meters (164 feet) southeast to 2-foot bank at edge of dredge dump, 15 meters (49 feet) north-northeast to right bank of bayou. To reach station from High Island, go one-half mile to landing, cross bayou, turn right and follow bayou to second bend and station site 14 feet from edge of bank and about $2\frac{1}{2}$ feet above mean low water level. Surface mark, an iron pipe, was replaced in 1931 with standard disk station mark in concrete, note 1 (a), projecting 1 foot above ground. Underground mark is a 2-gallon jar filled with cement and buried 3 feet below the surface of the ground. In 1931 two new reference marks, standard reference disks in concrete, note 11 (a), were established, flush with ground. No. 1 is about 88 feet south of edge of bank, 153.36 feet southeast of station, and $43^{\circ}46'$ to right of High Island church steeple; no. 2 is 100 feet south of edge of bank, 112.52 feet west of station, and $160^{\circ}39'$ to right of High Island, church steeple. Azimuth from station to chimney of small house on High Island is $310^{\circ}42'$; and to southwest end of lower clump of trees, $316^{\circ}42'$.

Nederland (U.S.E.) (Jefferson County, F. L. Gallen, 1931).—In eastern outskirts of town of Nederland, in west corner of vacant lot belonging to Dr. F. H. Haizlip, of Nederland, 0.2 mile northeast of paved highway (route no. 8), and of the railway tracks just south of railway station, 50 feet east of center line of the third crossroad northeast of tracks, 200 feet west of Mr. Willis' house, 27.5 feet northeast of side street, and 39.5 feet southeast of main street. The original Engineers' mark consisted of a 3-inch concrete-filled iron pipe, uncapped, and marked in its center with lead plug. Base of pipe is in concrete, and pipe projected about 12 inches above ground. The pipe was left in place, a block of concrete 12 inches square was cast around the exposed end and a standard disk station mark set in the concrete in head of pipe. Mark now projects 16 inches above ground. Description states that an underground mark was set, a standard disk station mark in concrete, note 7 (a), but this may be an error. Reference marks are standard reference disks in concrete, note 11 (a). No. 1 projects 6 inches above ground, is 0.5 mile northeast of railway station Nederland, 35 feet north of intersection of main road and side road, 200 feet southwest of a house, 25.5 feet northeast of side road, 27.5 feet north-

west of main road, 0.25 mile from station, and $17^{\circ}46'20''$ to right of Nederland, Pure Oil Refinery, tallest stack. No. 2 projects 12 inches above ground, is in south corner of vacant lot, 0.2 mile northeast of railway station, 30 feet north of center line of intersection of main dirt road and third crossroad northeast of main paved highway, 25.5 feet northwest of center line of main road, 25.5 feet northeast of center line of side road, 65.80 feet from station, and $288^{\circ}33'$ to right of Nederland, Pure Oil Refinery, tallest stack.

Primary traverse station no. 63M (U.S.G.S.) (Jefferson County, F. L. Gallen, 1931).—About 5 miles north of Port Arthur (7.3 miles by road from business district), 3 miles southeast of Nederland, 26 feet south of center line of Highway No. 8, 100 feet west of point where highway crosses single track branch of Kansas City Southern Railway to Port Neches, and 113.886 meters (373.64 feet) in azimuth $162^{\circ}20'08''$ from station *Doornbos* (see description thereof). Marked by brass disk marked "U.S. Geological Survey, P.T. sta. no. 63M, 1925", in top of concrete post 5 inches square, projecting 0.7 foot above surface of ground. Nearby is station *Spur* (U.S.E.) (see description thereof), and 3.75 feet south of station is another iron pipe similar to station *Spur* (U.S.E.) except that it is loose in ground.

Spur (U.S.E.) (Jefferson County, F. L. Gallen, 1931).—About 5 miles north of Port Arthur (7.3 miles by road from business district), 3 miles southeast of Nederland, on south side of Highway No. 8, 49.65 feet east of east rail of single track branch of Kansas City Southern Railway to Port Neches, 16.7 feet northeast of second power line pole south of station *Doornbos* (see description thereof), and 43.861 meters (143.90 feet) in azimuth $18^{\circ}08'$ from station *Doornbos*. Marked by 3-inch, uncapped, iron pipe, filled with concrete, and lead centered. Pipe is firm in ground and projects 1 foot above surface. A similar mark (except that it is loose in ground) is 3.75 feet south of P.T. sta. no. 63M (U.S.G.S.) (see description thereof).

For notes in regard to marking of stations see p. 154.

ELEVATIONS OF TRIANGULATION STATIONS

In the first-order triangulation executed by the Coast and Geodetic Survey it has been the practice to supplement the observation of horizontal directions, which are used in the determination of geographic positions, with observations of vertical angles, determining the inclinations of the lines between stations, and thereby permitting the computation of differences of elevation between contiguous stations; and through connection to points of known elevation making possible the computation of elevations of the stations.

The determination of elevations of occupied stations along an arc of triangulation has a single major purpose—that of supplying the data required for reducing to sea level the observed values of horizontal directions.

But such elevations have a secondary value, the supplying to geographers and others of elevations in areas where such information is rare. To further meet this second need vertical angles are observed on supplementary stations along an arc, and through differences of elevation thus determined from one or more occupied stations, the elevations of unoccupied points, such as mountain peaks, tops of church spires, and water tanks are obtained.

The accuracy of elevations determined by the observation of vertical angles is very inferior to that of elevations determined by even the simplest forms of spirit leveling. Where a complex net, involving a number of conditions through observations along all or nearly all the lines of an arc, makes possible a least-squares adjustment of the net and the computation of probable errors of the resulting elevations, it has been found that such probable errors go as high as 1 meter for the main-scheme stations most remote from those points whose elevations were held fixed in the adjustment, while the elevations of the unoccupied supplementary stations, based on the adjusted values for main-scheme stations, may be subject to uncertainties as great as 3 or 4 meters.

For geographic purposes such elevations may be of considerable value, since they may be very much more accurate than any other values available for the respective points. For engineering purposes, however, their uses are limited. Such an elevation will furnish an approximate value of mean sea level and may be used as a starting elevation for an engineering survey, being much superior to any datum that might otherwise be arbitrarily selected. Where it is so used, care must be taken to clearly indicate that the levels based on it are on an approximate sea-level datum, and subject to a uniform shift when and if connection is made to a bench mark of the first-order level net of the country. Elevations of stations determined by vertical angles must not be used for the adjustment of lines of spirit levels between such stations, though they do furnish a rough check which should be of value in indicating any blunders of appreciable size, should such exist in a line of levels.

For the convenience of the engineer and of others who may desire to use the data contained in this publication, the elevations of the first-order stations and of a few marked supplementary stations except as noted below, have been placed at the ends of the descriptions

of the respective stations. Along two arcs, however, the elevations are of an accuracy inferior to that indicated above, and in order to call attention to that condition, and further safeguard their use where more accurate data are required, the elevations along these arcs—the Texas-Oklahoma boundary arc (parallel of $36^{\circ}30'$) and the Amarillo-Del Rio arc—are presented in tabular form below. Since the quality of the observations along these two arcs did not justify a least-squares adjustment, an accurate estimate of the probable errors of the adopted elevations cannot be given, but such probable errors may range all the way from a few tenths of a meter for stations close to the control points from which the arc takes elevation, to as much as 3 meters for points most remote therefrom. It may be said in passing that this condition arose very directly from the abnormal refraction conditions encountered along these arcs at the times of day when it was found necessary to make the vertical angle observations.

Following the tables of elevations along the above two arcs will be found tables of elevations for the supplementary stations along the various arcs. Along the Gulf Coast and ninety-fourth meridian arcs where it could be known without the aid of special observations that the reduction to sea level for observed horizontal directions would be negligible, no vertical angle observations were made, and consequently no elevations for stations along these arcs are given.

In the index at the end of this volume will be found a column giving the page numbers on which elevations of stations will be found. Where no page number is given, it must be inferred that no elevation is available.

TABLES OF ELEVATIONS

Texas-Oklahoma boundary arc (parallel of $36^{\circ}30'$)

Station	Point to which elevation refers	Elevation	
		Meters	Feet
<i>Principal points</i>			
Eklund (N.Mex.)	Station mark	1,619.8	5,314
School (Okla.)	do	1,449.7	4,756
Worsham	do	1,444.6	4,739
Felt (Okla.)	do	1,363.0	4,472
X. I. T.	do	1,339.7	4,395
Harmer (Okla.)	do	1,308.0	4,291
Schellenberg	do	1,284.0	4,213
Rogers (Okla.)	do	1,250.7	4,103
Sneed	do	1,244.8	4,084
Mooney (Okla.)	do	1,190.8	3,907
Kerrick	do	1,182.0	3,878
Griggs (Okla.)	do	1,140.6	3,742
O'Brien	do	1,128.7	3,703
Mouse (Okla.)	do	1,062.4	3,486
Elliott	do	1,067.0	3,501
Whorton (Okla.)	do	1,045.0	3,428
Hardy	do	1,078.1	3,537
Camp (Okla.)	do	1,001.7	3,286
Graham	do	1,010.6	3,316
Bridgeman (Okla.)	do	939.5	3,082
Chipperfield	do	968.0	3,176
Wall (Okla.)	do	906.2	2,983
Browder	do	936.5	3,072
Barnes (Okla.)	do	863.1	2,832
Hogland	do	917.2	3,009
Mitchusson (Okla.)	do	887.8	2,913
Campbell	do	906.3	2,973
Shadwick (Okla.)	do	884.9	2,903
Morris	do	886.8	2,909
Pruett (Okla.)	do	849.6	2,787
Booker	do	862.0	2,828
Carbin (Okla.)	do	829.5	2,721
Kirschman	do	848.2	2,783
Ivanhoe (Okla.)	do	800.4	2,626

Amarillo-Del Rio arc

Station	Point to which elevation refers	Elevation	
		Meters	Feet
<i>Principal points</i>			
Wesley	Station mark	1,064.0	3,491
Neal	do	1,109.9	3,641
Ackley	do	1,060.1	3,478
Klein	do	1,104.3	3,623
Shafer	do	1,040.5	3,414
Tulia	do	1,080.6	3,545
Kress	do	1,046.1	3,432
Bush	do	1,077.1	3,534
Heath	do	1,029.4	3,377
Watson	do	1,064.4	3,492
Rogers	do	1,023.7	3,359
Teston	do	1,056.2	3,465
Stewart	do	1,008.7	3,309
Holmes	do	1,036.3	3,400
Lincecum	do	994.6	3,263
Foster	do	1,023.0	3,356
Holt	do	964.6	3,165
McCauley	do	993.5	3,260
B. M. J 71 eccentric.	do	967.8	3,142
Shepard	do	991.3	3,252
Hillen	do	945.5	3,102
Thomas	do	974.2	3,196
Bartley	do	940.0	3,084
Crosby	do	961.5	3,155
Pennington	do	919.8	3,018
Pearce	do	936.2	3,072
Huff	do	905.7	2,971
Akins	do	917.5	3,010
Southard	do	887.2	2,911
Lamesa	do	903.1	2,963
Wasson	do	875.8	2,873
King	do	887.0	2,910
Davenport	do	855.2	2,806
Mosley	do	863.1	2,832
Abrams	do	824.3	2,704
Zihlman	do	812.5	2,666
Woolsey	do	810.3	2,658
Curry	do	839.9	2,756
Medlin	do	819.3	2,688
Garden	do	830.1	2,723
Bigby	do	824.8	2,706
Shields	do	817.0	2,680
Kanz	do	813.7	2,670
Ricker	do	815.4	2,675
Fence (U. S. G. S.)	do	816.3	2,678
Hughes	do	805.2	2,642
Low (U. S. G. S.)	do	901.0	2,956
Japson (U. S. G. S.)	do	835.7	2,742
Shell	do	897.9	2,940
Cox (U. S. G. S.)	do	848.9	2,785
Carroll (U. S. G. S.)	do	840.3	2,757
Powell	do	861.7	2,827
Schneeman	do	835.3	2,740
Crockett	do	837.7	2,748
Shannon	do	830.0	2,723
Todd	do	836.0	2,743
University	do	812.1	2,664
Massie	do	801.1	2,628
Longhorn	do	790.3	2,593
Lee	do	774.9	2,542
Henderson	do	767.7	2,519
Hoover	do	756.5	2,482
Pierce	do	731.5	2,400
Mitchell	do	715.7	2,348
Cauthorn	do	682.2	2,238
Mills	do	676.7	2,220

Ninety-eighth meridian arc

Station	Point to which elevation refers	Elevation
<i>Supplementary points</i>		<i>Feet</i>
Nocona Baptist Church.....	Ridge of roof.....	1,028
Nocona schoolhouse.....	do.....	1,036
Ringgold Presbyterian Church.....	Top of tower.....	950
Henrietta, Clay County courthouse.....	do.....	1,023
Henrietta schoolhouse.....	do.....	976
Henrietta standpipe.....	Top.....	1,023
House 5 miles southeast of Henrietta.....	Ridge of roof.....	993
House on ridge, north chimney.....	Top of chimney.....	1,042
Bellevue, Webb's house.....	Peak of cupola.....	1,103
Bellevue Methodist Episcopal Church ¹	East gable.....	1,134
Bellevue, Orton's windmill.....	Center of wheel.....	1,094
Bowdecker's windmill.....	do.....	1,118
Bowie standpipe.....	Top.....	1,258
Bowie National Hotel.....	Lower edge of conical roof of tower.....	1,199
Bowie Methodist Church.....	Ridge of roof.....	1,179
Chico church with open spire.....	do.....	1,100
Chico church with square-top spire.....	do.....	1,112
Jacksboro courthouse.....	do.....	1,145
Jacksboro jail.....	Top of spire.....	1,114
Old chimney northwest of Joplin.....	Top of chimney.....	1,222
Agnes highest windmill.....	Center of wheel.....	1,270
Agnes schoolhouse.....	Ridge of roof.....	1,270
Weatherford tank near white house ¹	Top of tank.....	1,209
Weatherford white house ¹	Bottom of cupola.....	1,205
Weatherford yellow house.....	do.....	1,175
Lingleville schoolhouse.....	Top of cupola.....	1,620
Lingleville open belfry.....	Top of belfry.....	1,606
Stephenville courthouse.....	Top of spire.....	1,390
Stephenville oil mill.....	Top of stack.....	1,365
Stephenville, Tarleton College.....	Top of conical tower.....	1,390
Do.....	Top of roof.....	1,357
Long house, north center chimney.....	Top of chimney.....	1,472
Johnsville cotton gin.....	Top of stack.....	1,296
Dublin standpipe.....	Top.....	1,565
Dublin high school.....	Ridge of roof.....	1,559
Dublin church.....	do.....	1,529
Dublin oil mill.....	Top of tower.....	1,544
Purves schoolhouse.....	Top of roof.....	1,463
Purves cotton gin.....	Top of stack.....	1,478
Carlton cotton gin.....	do.....	1,407
Olin cotton gin ¹	do.....	1,382
White church southeast of Chambliss.....	Ridge of roof.....	1,237
Copperas Cove church ¹	Top of spire.....	1,122
Copperas Cove schoolhouse.....	Top of roof.....	1,126
Lampasas courthouse.....	Top of dome.....	1,098
Lampasas spring house.....	Top of cupola.....	1,099
Lampasas schoolhouse.....	do.....	1,102
Lampasas First Baptist Church spire.....	Top of pyramid.....	1,128
Bertram, railroad windmill.....	Center of wheel.....	1,307
Bertram Methodist Church spire.....	Top of cone.....	1,312
Austin, Capitol.....	Star in hand of Liberty.....	850
Austin Colored Asylum.....	Top of standpipe.....	726
Do.....	Dome at south end.....	706
Hornbortel's (August) gin.....	Top of stack.....	574
New Braunfels Catholic Church.....	Top of spire.....	755
New Braunfels spire, massive base, slim cone, silver ball on top.....	Top.....	732
New Braunfels courthouse.....	Top of tower.....	712
New Braunfels standpipe.....	Top.....	735
Kingsbury, tall stack with cross ¹	do.....	664
Church, red spire, north end of building.....	Top of cone.....	615
Round tank, light-colored, east of Seguin.....	Top.....	574
Marion Lutheran Church.....	Top of spire.....	688
Marion, Schultz & Dreyer's cotton gin.....	Top of smokestack.....	693
Seguin oil factory.....	Top of tall water tower.....	635
Seguin courthouse.....	Spire.....	604
Seguin schoolhouse, quite high spire, short tower, 2 col-lars.....	Top of spire.....	600
Seguin, Zanke's gin.....	Top of tall brick smokestack.....	601
Seguin, cotton compress building.....	Top.....	601
Seguin Milling & Power Co.....	Top of water tank.....	602
Seguin Catholic Church, high sharp spire.....	Point of cone.....	586
Steins church.....	Spire.....	635
St. Hedwig Catholic Church.....	Top of heavy stone tower.....	665
Cestohowa church spire.....	Top of cone.....	392
Panna Maria church spire.....	Top.....	406
Karnes City courthouse.....	Top of steeple.....	520
Runge church.....	Tallest spire.....	401
Jones' (Captain) house ¹	Tallest cone.....	328

¹ No check on this elevation.

Ninety-eighth meridian arc—Continued

Station	Point to which elevation refers	Elevation
<i>Supplementary points—Continued</i>		<i>Feet</i>
Beeville Catholic Church spire.....	Top of cone.....	301
Beeville water tower.....	Top.....	303
Clareville gin stack.....	do.....	315
Skidmore Methodist Church spire.....	Top of cone.....	203
Skidmore Catholic Church spire.....	do.....	203
Skidmore Baptist Church spire ¹	Top of tallest building.....	206
Mathis gin stack.....	Top.....	206
Mathis Methodist Church spire.....	Top of cone.....	205
McNeill's (P. E.) house, windmill.....	Center of wheel.....	233
King's ranch house.....	Tallest chimney.....	162
Banquete, Cyrus Elliff's house.....	Top of chimney.....	131
Wood's ranch house.....	Top of cupola.....	180
Parkman's gin stack.....	Top.....	250
Alice spire.....	do.....	252
Alice, Walters & Co.'s gin stack.....	do.....	256
Alice Catholic Church spire.....	do.....	264
Alice standpipe.....	do.....	346
Bishop standpipe.....	do.....	159
Kingsville standpipe.....	do.....	174
Kingsville Presbyterian Church.....	Top of steeple.....	145
Kingsville, Henrietta M. King School.....	Top of cupola.....	135
Kingsville, Frisco railroad shops (taller of 2 metal stacks).....	Top.....	158
Kingsville Methodist Church.....	Top of spire.....	122
Ricardo schoolhouse.....	Top of cupola.....	80
Riviera schoolhouse.....	do.....	97
Kenedy ranch oil well derrick.....	Top of derrick.....	115
Kenedy ranch oil well derrick ¹	Ground at foot.....	23
Turcotte section house.....	Top of north chimney.....	54
Armstrong, railroad water tank ¹	Top.....	65
Windmill ¼ mile north-northeast of Norias' house ¹	Ground.....	17
Norias' house.....	Top of south gable.....	43
Rudolph water tank.....	Top.....	63
Raymondville water tank, 1913.....	do.....	68
Raymondville cotton gin smokestack.....	do.....	91
Harlingen pumping station.....	Top of tall stack.....	180
Do.....	Top of low stack.....	137
Harlingen sugar mill.....	Top of steel derrick with yardarm.....	175
Harlingen standpipe.....	Top.....	179
Heidelberg church.....	Top of steeple.....	135
La Feria pumping station second lift.....	Top of stack.....	150
Santa Maria Catholic Church spire.....	Top of ball at bottom of cross.....	133
Mercedes Canal pumping station.....	Top of tall stack.....	181
La Feria pumping station first lift.....	do.....	159
San Benito pumping station.....	Top of short cylindrical stack.....	137
Mercedes west church.....	Top of steeple.....	143
Mercedes east church.....	do.....	136
Mercedes standpipe.....	Top.....	158
Progreso church.....	Top of steeple.....	141
San Benito sugar mill.....	Top of tall brick stack.....	181

¹ No check on this elevation.*Ninety-eighth meridian to Point Isabel arc*

Station	Point to which elevation refers	Elevation	
		Meters	Feet
<i>Supplementary points</i>			
Cowgill water tank.....	Top.....	23.8	78
San Benito sugar mill.....	Top of tall brick stack.....	55.2	181
San Benito standpipe.....	Top.....	45.7	150
San Benito Bank & Trust Co. building ¹	Top of cupola on southwest corner.....	26.5	87
Olmito factory, north stack.....	Top.....	36.0	118
Olmito factory, south stack.....	do.....	40.6	133

¹ No check on this elevation.

Texas-California arc

Station	Point to which elevation refers	Elevation
<i>Supplementary points</i>		<i>Feet</i>
Carbon schoolhouse	Top of roof	1,651
Eastland courthouse	Top of dome	1,532
Eastland schoolhouse	Top of roof	1,502
Cisco standpipe	Top	1,743
Cisco Methodist Church	Top of cone	1,704
Church, 7 miles south of Cisco	Top of roof	1,697
Baird courthouse	Top of dome	1,768
Baird, tall church	Top of spire	1,787
Clyde church	Bottom of cone	2,031
Abilene standpipe (U.S.G.S.)	Top	1,846
Abilene courthouse	Top of dome	1,806
Abilene, low standpipe	Top	1,826
Abilene asylum stack	do	1,844
Church north of Tye	Top of roof	1,791
Tye Baptist Church	Top of spire	1,853
Tye Methodist Church	do	1,837
Church, 6 miles west of Morrison	Top	1,830
Merkel church	Top of spire	1,933
Merkel electric light plant	Top of stack	1,936
Merkel, tall water tank	Top	1,919
Trent schoolhouse belfry	do	1,953
Trent Christian Church	Bottom of cone	1,942
Eskota water tank	Top	1,967
Sweetwater schoolhouse	Top of roof	2,221
Roscoe cotton gin	Top of stack	2,457
Roscoe schoolhouse	Top of cupola	2,449
Lorraine schoolhouse	Top of dome	2,416
Colorado, west standpipe	Top	2,274
Westbrook Methodist Church	Top of spire	2,215
Morgans Peak	Top	2,300
Muchakooago (Mushaway) Peak	do	2,862
Stanton courthouse	Top of cupola	2,785
Midland courthouse	do	2,848
Odessa courthouse ¹	do	2,950
Castle Gap Mountain	Top	3,155
Judkin schoolhouse	Top of cupola	2,936
Windmill, 2 miles south of station Dublin	Center of wheel	3,238
Barstow courthouse	Top of cupola	2,638
Pecos courthouse ¹	do	2,663
Davis	Top of peak	6,551
Flat Top	do	4,010
Gomez Peak	Top	6,323
High or Sawtooth Mountain	Top	7,686
Cone	Top of peak	4,965
Pinnacle	do	4,177
South Guard Mountain	Top	8,850

¹ No check on this elevation.*Rio Grande arc*

<i>Supplementary points</i>		<i>Feet</i>
San Juan standpipe	Base of finial	193
Edinburg courthouse	Top of cupola	186
Pharr standpipe	Base of finial	158
Mission, third lift pump	Top of tall stack	254
Hidalgo church steeple	Base of finial	175
Mission, first lift pump	Top of stack	218
Monastery, north end	East cupola	193
Rio Grande standpipe	Base of finial	299
Rio Grande, Starr County courthouse, dome	do	276
Rio Grande Catholic Church	Intersection of 2 slopes of steeple	240
Roma Catholic Church, spire	Base of finial	284
Roma Church of the Covenant	Base of cupola	259
Zapata post office	Roof	320
Zapata, church steeple	Base of finial	320
Laredo, electric light and power plant	Top of brick stack	560
Laredo north wireless mast	Top	718
Laredo south wireless mast	do	714
Nuevo Laredo standpipe	do	525
Central Laredo waterworks	Top of brick stack	487
Matthews' ranch windmill	Hub of wheel	580
Tordillo, white house	West gable	488
Dentonio Hotel	South gable	839
Brackettville standpipe	Finial	1,254
Santa Rosa Mountain	Highest point	8,980
Black Mountain	do	7,549
Flat cone, southeast Baracho	do	5,654
Goat Mountain, northwest end	do	5,075

Red River boundary arc

Station	Point to which elevation refers	Elevation
<i>Supplementary points</i>		<i>Feet</i>
Ryan city water tank (Okla.)	Top	1,038
Ryan High School cupola (Okla.)	do	1,029
Waurika city water tank (Okla.)	do	999
Byers city water tank	do	1,084
Hastings High School cupola (Okla.)	do	1,080
Hastings city water tank (Okla.)	do	1,122
Petrolia High School cupola	do	1,053
Walters city water tank (Okla.)	do	1,072
Iowa Park city water tank	do	1,172
Wichita Falls, City Power & Electric Co. stack	do	1,127
Wichita Falls State Hospital water tank	do	1,114
Wichita Falls, Call Aviation Field water tank	do	1,167
Burkburnett city water tank	do	1,145
Devol city water tank (Okla.)	do	1,159
Grandfield city water tank (Okla.)	do	1,234
Grandfield High School cupola (Okla.)	do	1,195
Chattanooga city water tank (Okla.)	do	1,251
Electra city water tank	do	1,326
Vernon city water tank	do	1,328
Frederick city water tank (Okla.)	do	1,445
Olustee city water tank (Okla.)	do	1,430
Altus city water tank (Okla.)	do	1,572
Eldorado, U. S. Gypsum Co. water tank (Okla.)	do	1,568
Louis High School cupola (Okla.)	do	1,569
Gould High School, north chimney (Okla.)	do	1,668
Hollis city water tank (Okla.)	do	1,721
Quanah, courthouse cupola	do	1,648
Quanah city water tank	do	1,709

Thirty-fifth parallel arc

<i>Supplementary points</i>		<i>Feet</i>
Texola water tank	Top of finial	2,240
Wellington water tank	Top	2,189
Claude Methodist Episcopal Church spire	do	3,457
Claude courthouse	do	3,463
Amarillo, Great West mill and elevator	Light on top	3,853
Amarillo water tank	Top	3,755
Amarillo post office	do	3,725
Canyon, West Texas State Normal School	Belfry, east end, top	3,618
Bushland water tank	Top	3,861
Umbarger elevator	do	3,807
Wildorado, Lester Stone Co.'s elevator	do	3,975
Vega, Oldham County courthouse	do	4,075
Oil derrick ¹	do	3,980
Glenrio water tank	do	3,899

¹ No check on this elevation.*Texas-Oklahoma boundary (parallel of 36°30')*

<i>Supplementary points</i>		<i>Feet</i>
Texhomex (Tex.-Okla.-N.Mex.)	Station mark	4,712
T. 1 N., R. 4 E., sec. 36, southeast corner (Tex.-Okla.)	do	4,140
Clark monument no. 5 (Tex.-Okla.)	do	3,873
Hitchland south	do	3,132
Hitchland north	do	3,083
Hitch	do	3,113
Hansford County, Tex., northeast corner	Top of monument	2,755
Clark monument no. 10 (Tex.-Okla.)	Station mark	2,765
Dower (Tex.-Okla.)	do	2,925
Gaylord (Tex.-Okla.)	do	2,773
Northeast corner of Texas (1928)	do	2,483

Amarillo-Del Rio arc

Station	Point to which elevation refers	Elevation
<i>Supplementary points</i>		<i>Feet</i>
Hale County, southeast corner.....	Station mark.....	3, 267
B.M. J71.....	do.....	3, 143. 55

¹ Elevation determined by first-order levels.

Waco-Mansfield arc

<i>Supplementary points</i>		<i>Feet</i>
Coryell smokestack.....	Top.....	1, 033
Moody water tank.....	do.....	938
Delmore ranch, tall white silo.....		735
Hubbard standpipe.....		879
Coolidge standpipe.....		663
Groesbeck courthouse.....	Finial.....	581
Groesbeck standpipe.....		584
Wortham standpipe.....	Top.....	545
Mexia standpipe.....		650
Mexia, Mungers tank.....		614
Boggy Prairie oil derrick.....		597
Jacksonville First National Bank Building.....	Top of elevator shaft.....	600
Jacksonville Methodist Church.....	Dome.....	600
Timpson tank.....	Top.....	535
Timpson church.....		459
Center, tank at.....	Top.....	482

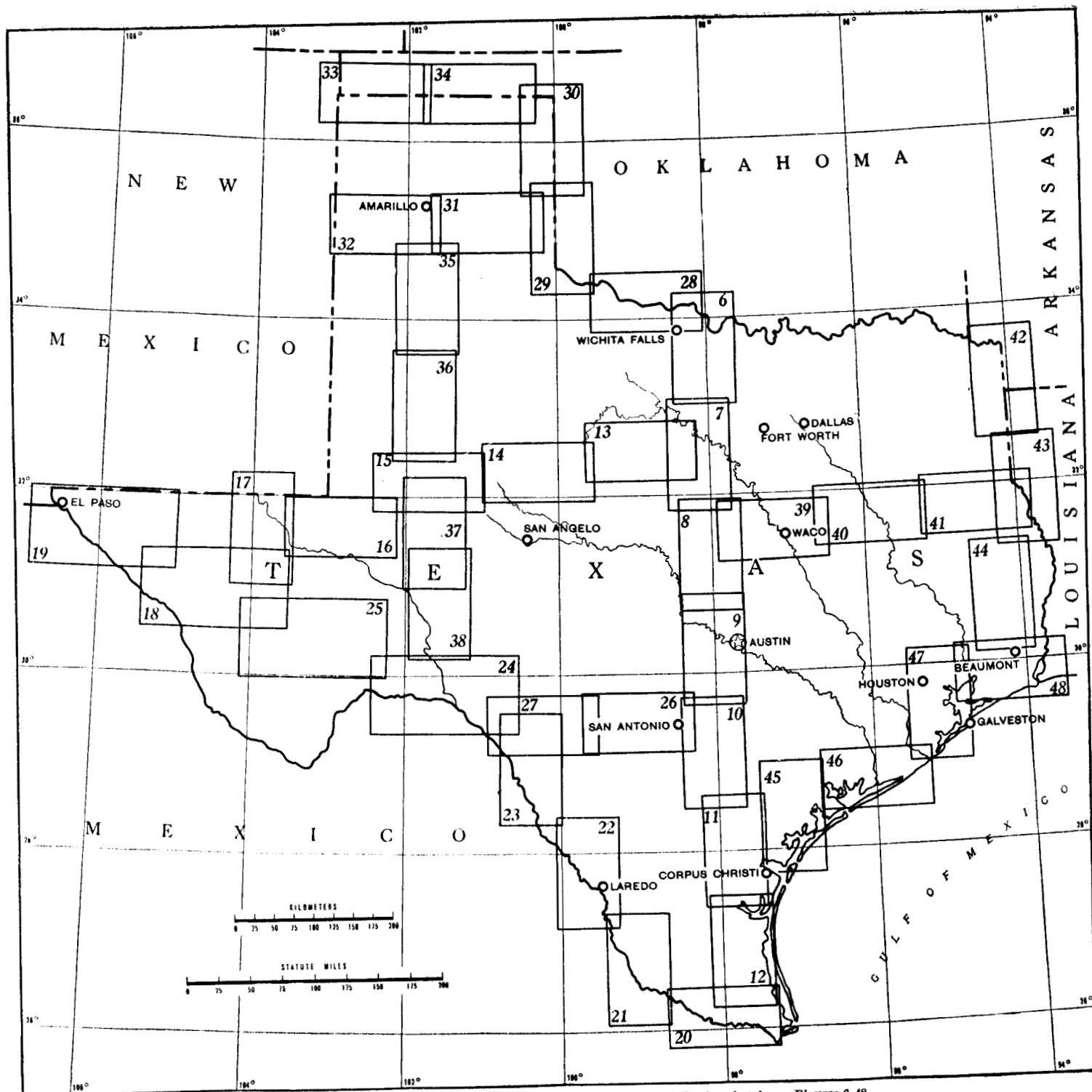


FIGURE 5.—Index map of Texas showing areas covered by each of the following sketches. Figures 6-48.

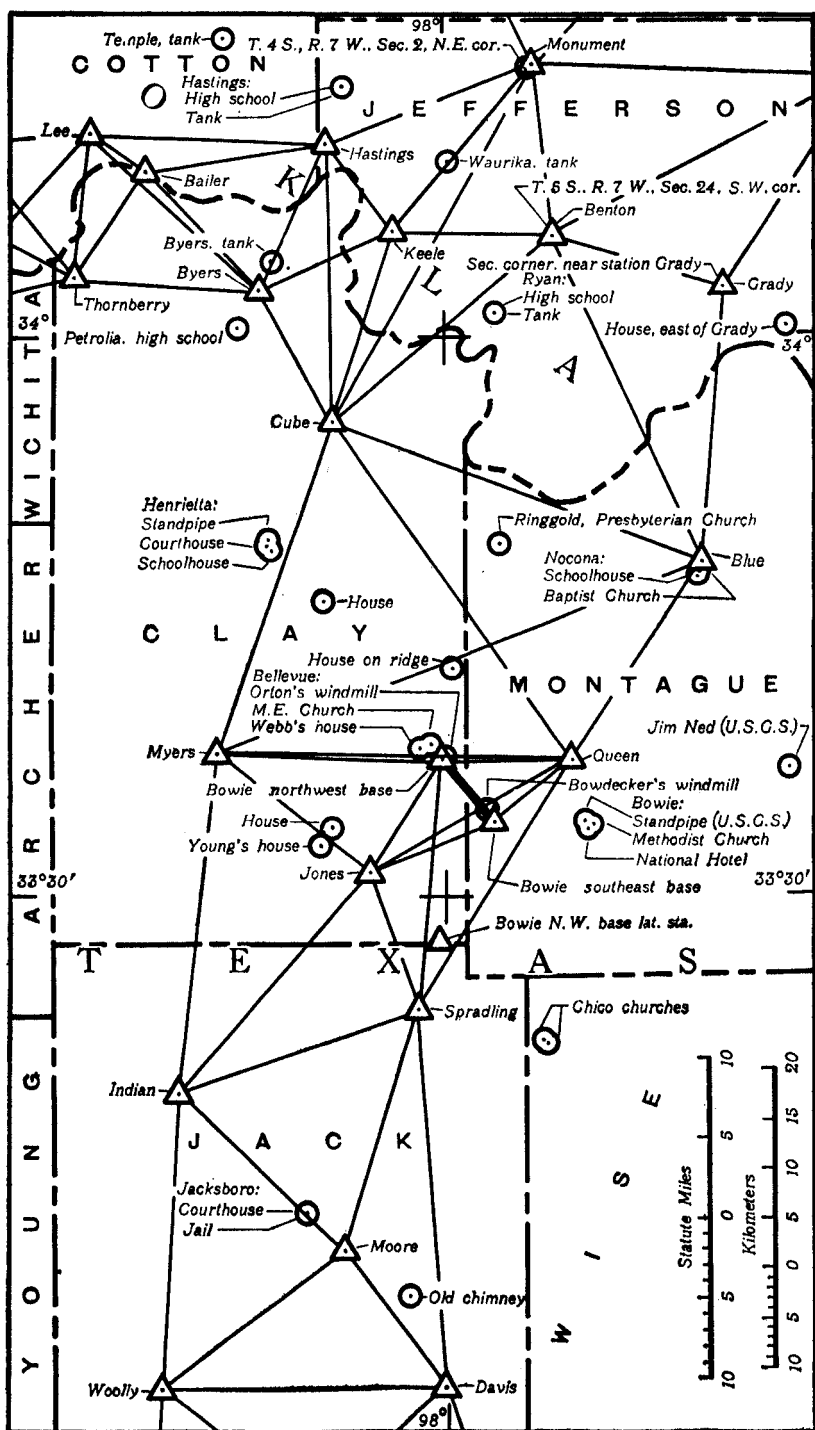


FIGURE 6.—Triangulation along the ninety-eighth meridian arc, junction with the Red River boundary arc.

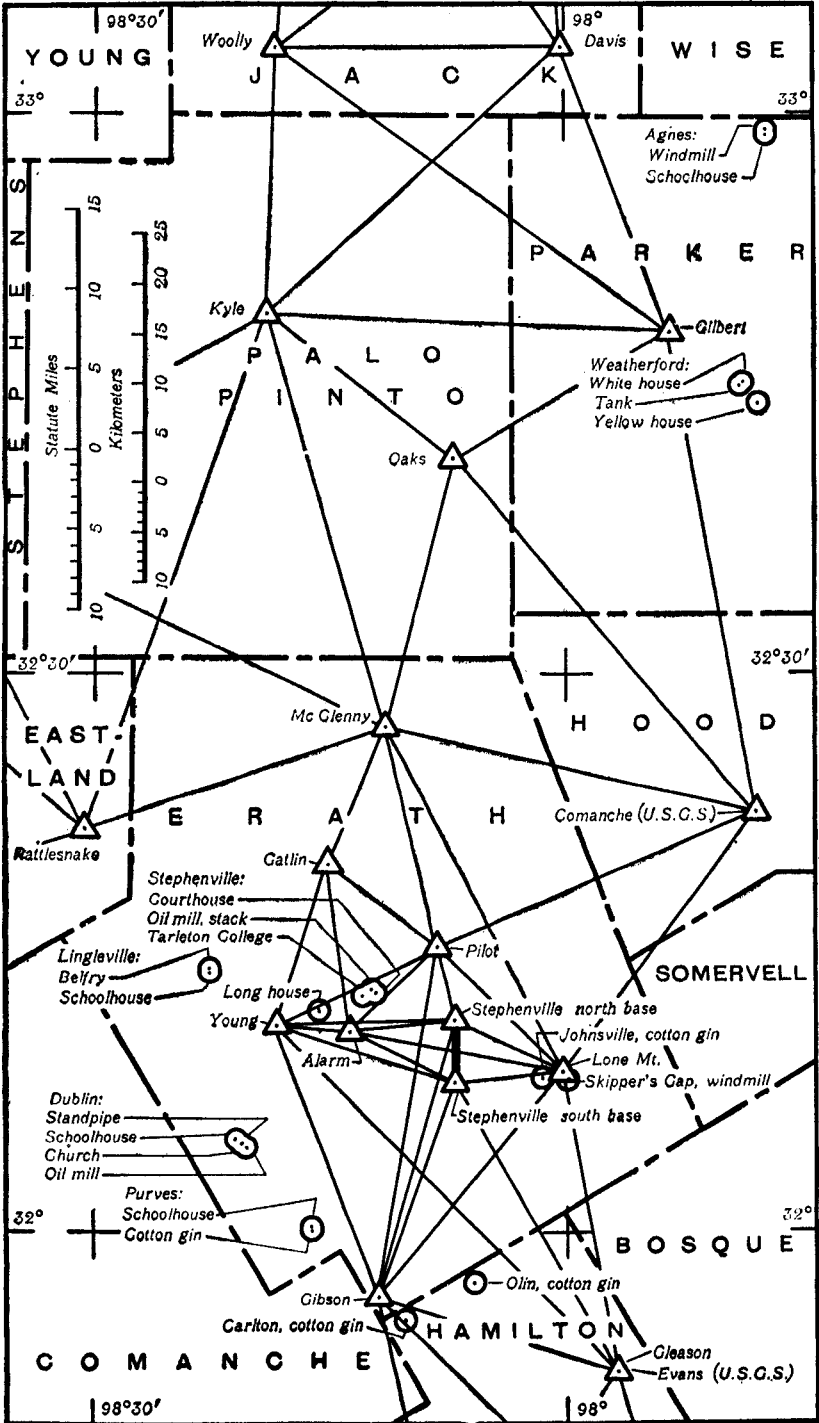


FIGURE 7.—Triangulation along the ninety-eighth meridian arc, junction with the Texas-California arc.

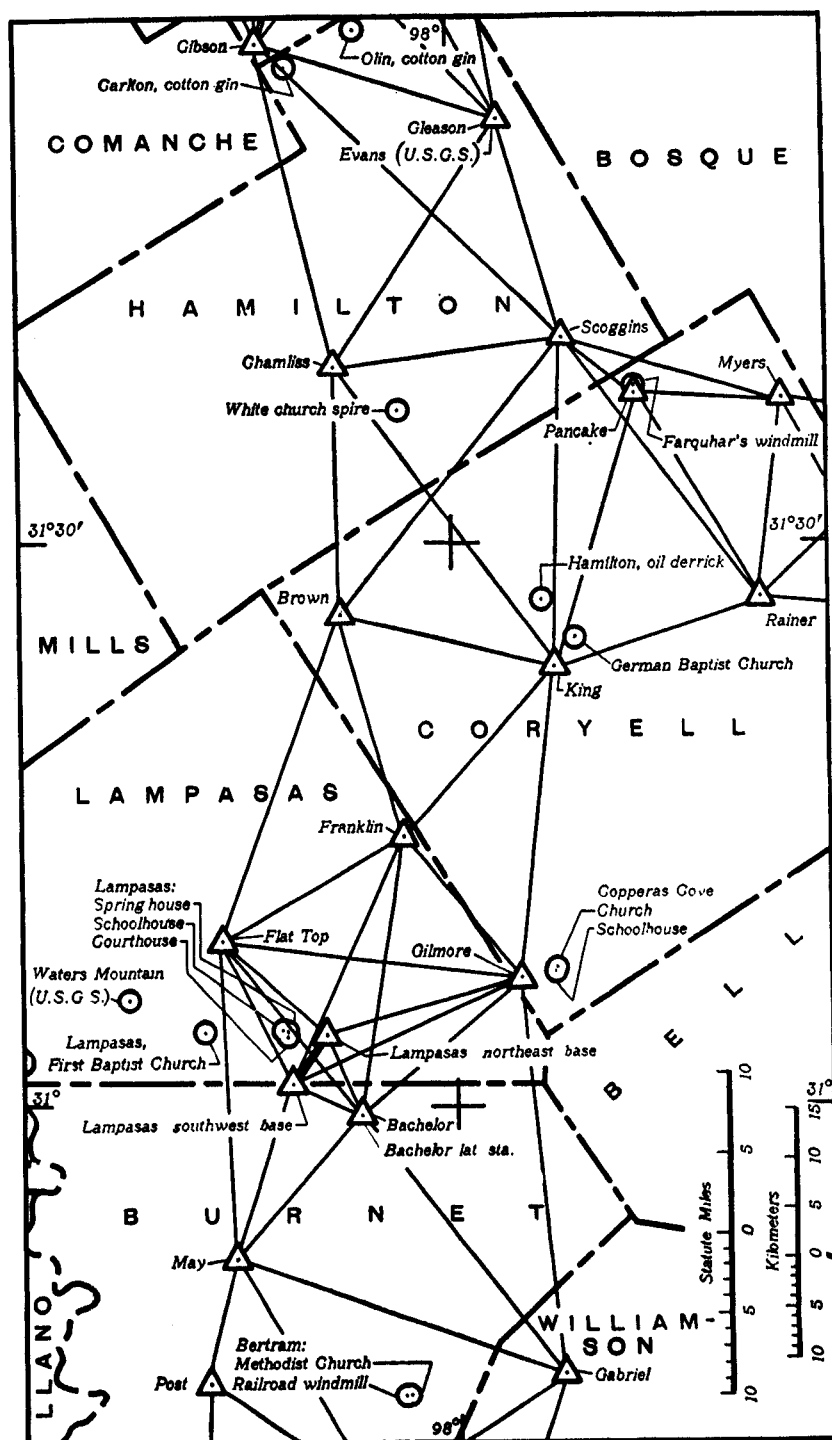


FIGURE 8.—Triangulation along the ninety-eighth meridian arc, junction with the Waco-Mansfield arc.

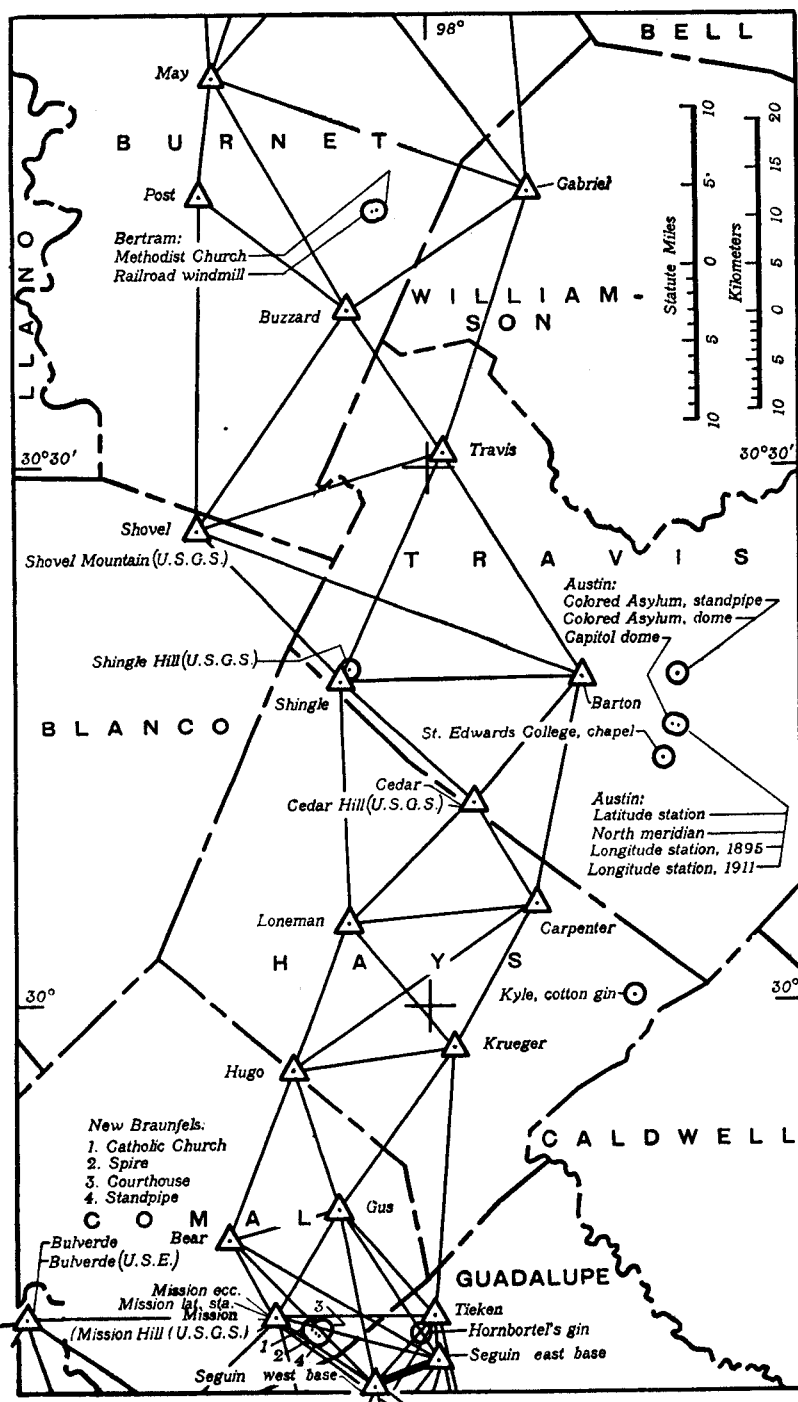


FIGURE 9.—Triangulation along the ninety-eighth meridian arc, junction with the San Antonio-Del Rio arc.

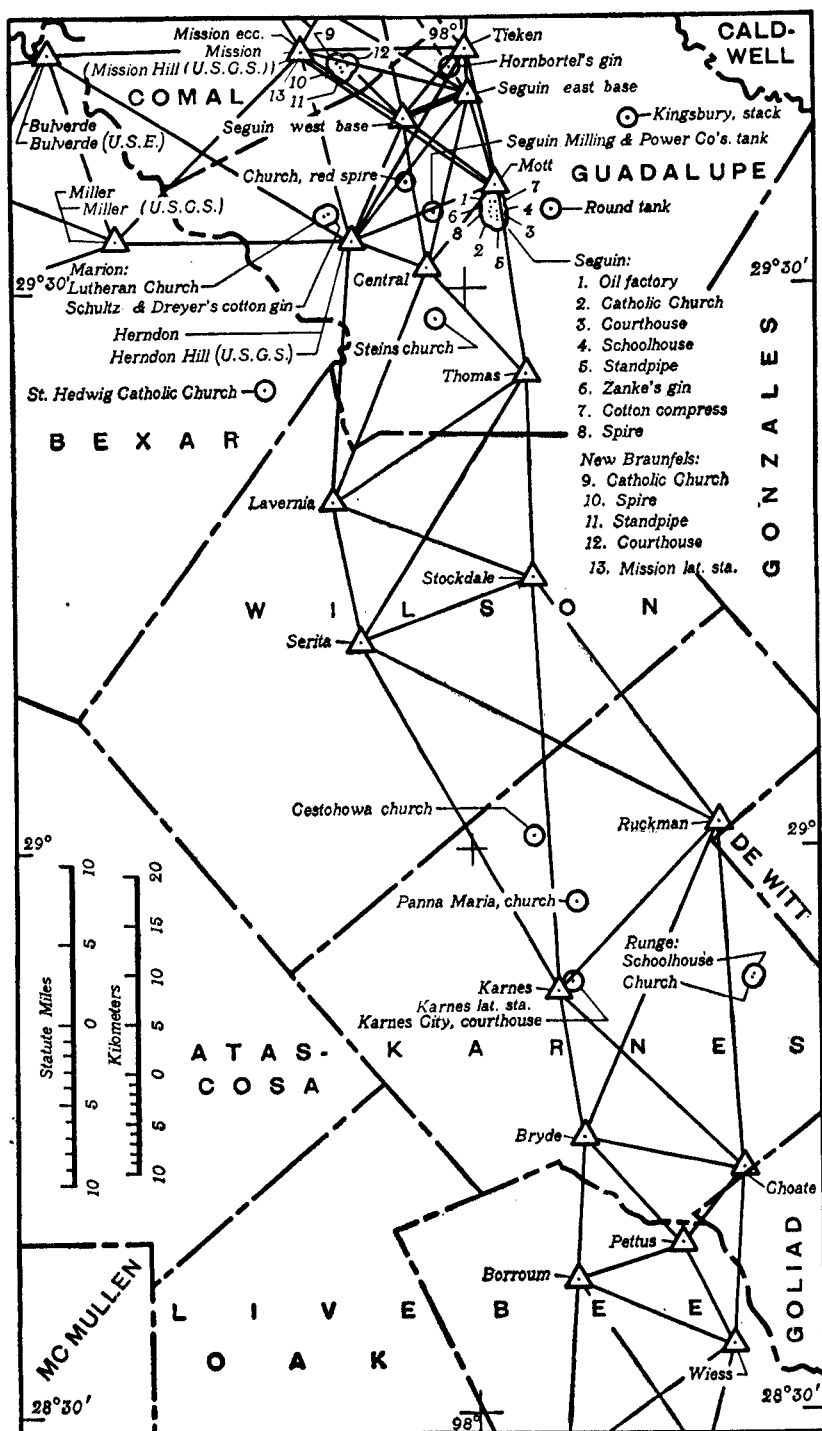


FIGURE 10.—Triangulation along the ninety-eighth meridian arc, junction with the San Antonio-Del Rio arc.

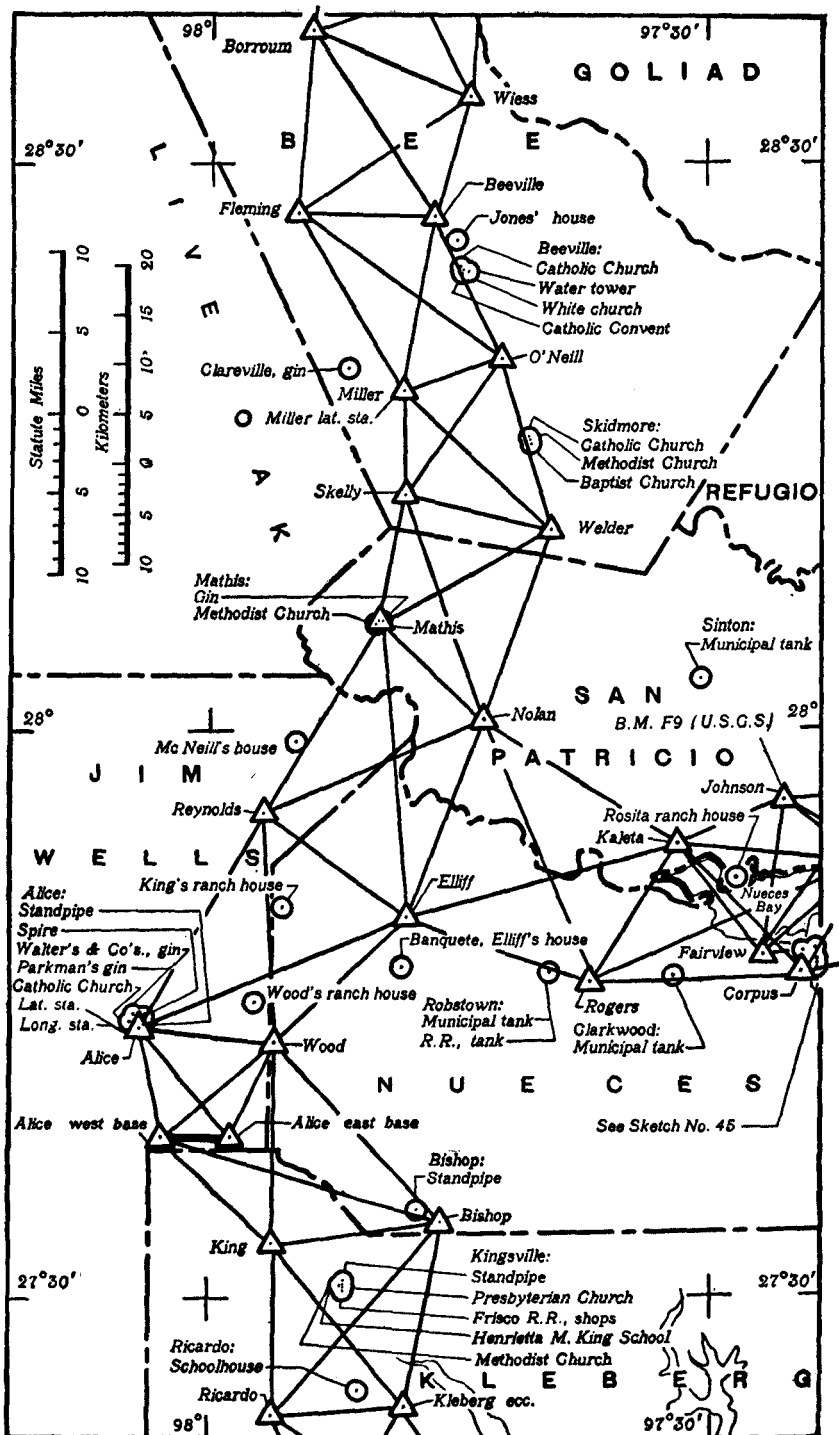


FIGURE 11.—Triangulation along the ninety-eighth meridian arc, junction with the Gulf Coast arc.

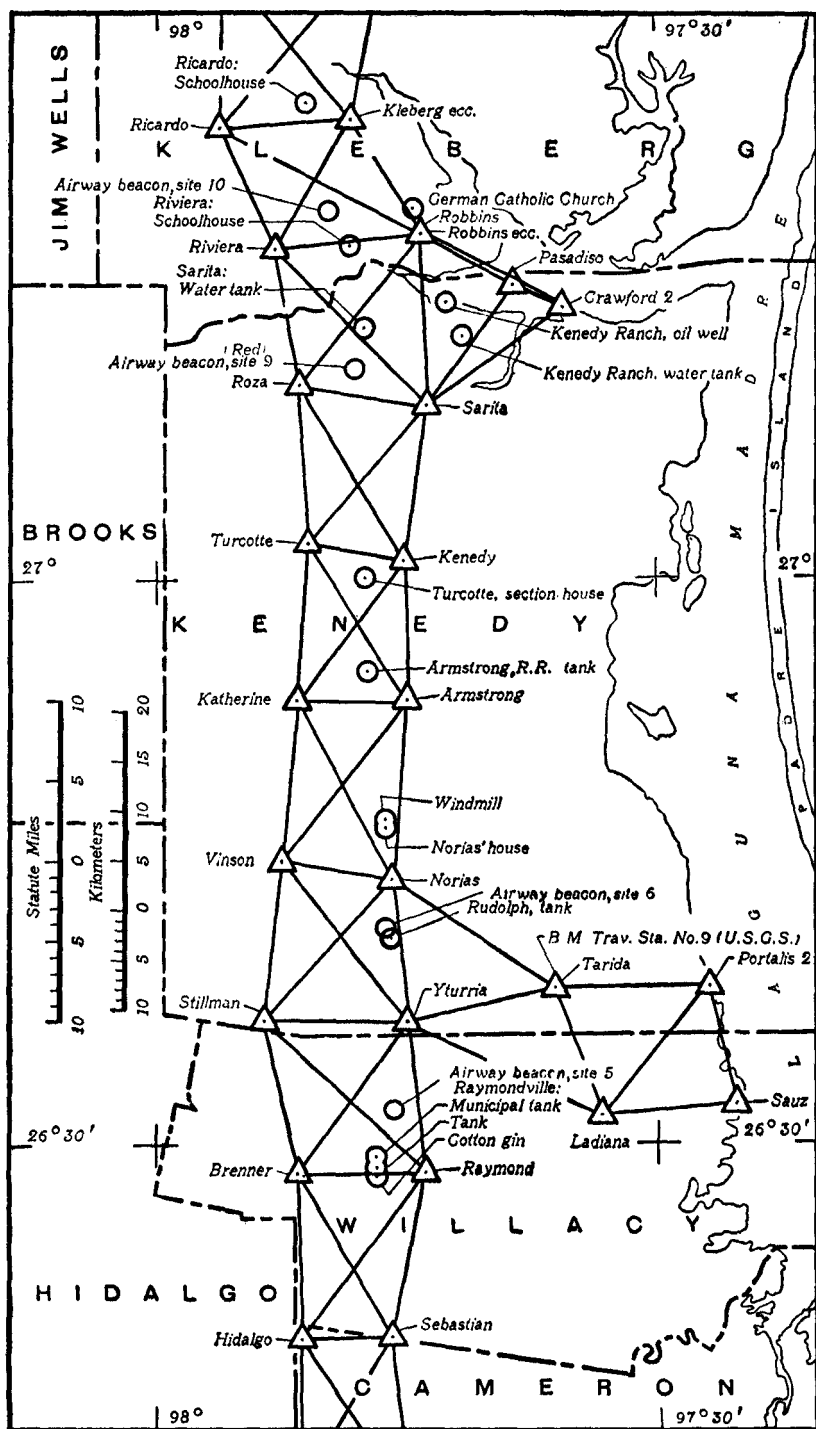


FIGURE 12.—Triangulation along the ninety-eighth meridian arc and extension to Laguna Madre.

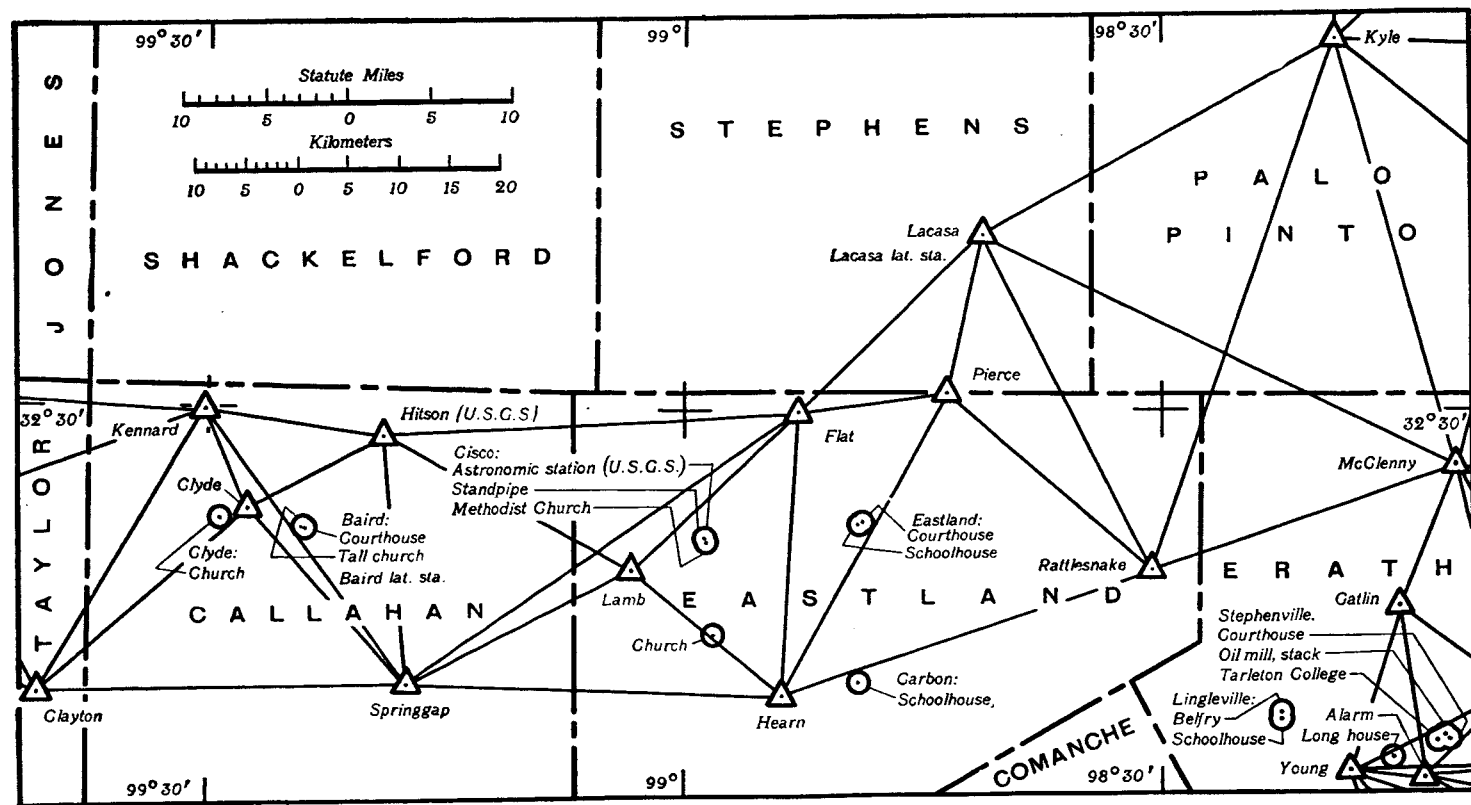


FIGURE 13.—Triangulation along the Texas-California arc, junction with the ninety-eighth meridian arc.

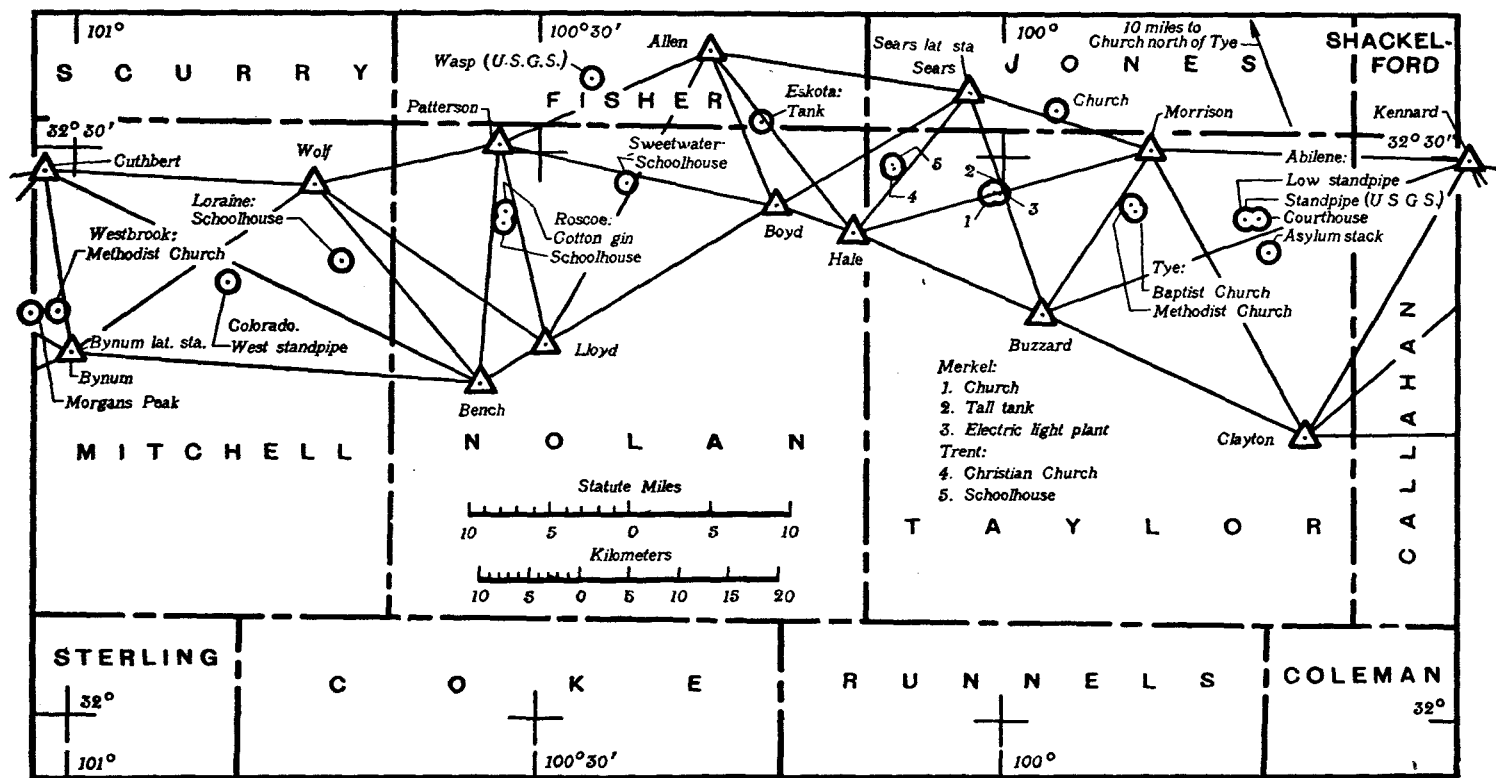


FIGURE 14.—Triangulation along the Texas-California arc.

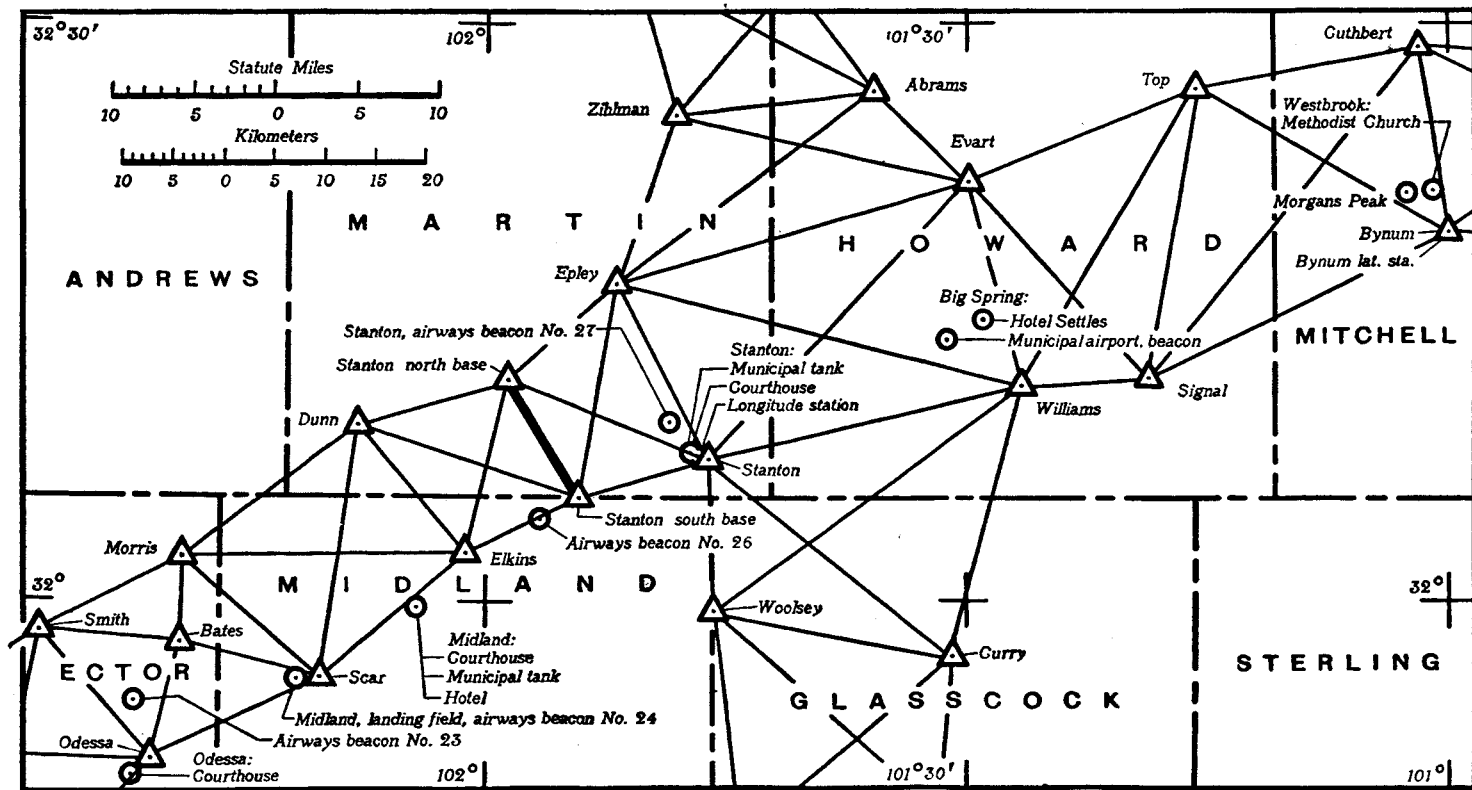


FIGURE 15.—Triangulation along the Texas-California arc, junction with the Amarillo-Del Rio arc.

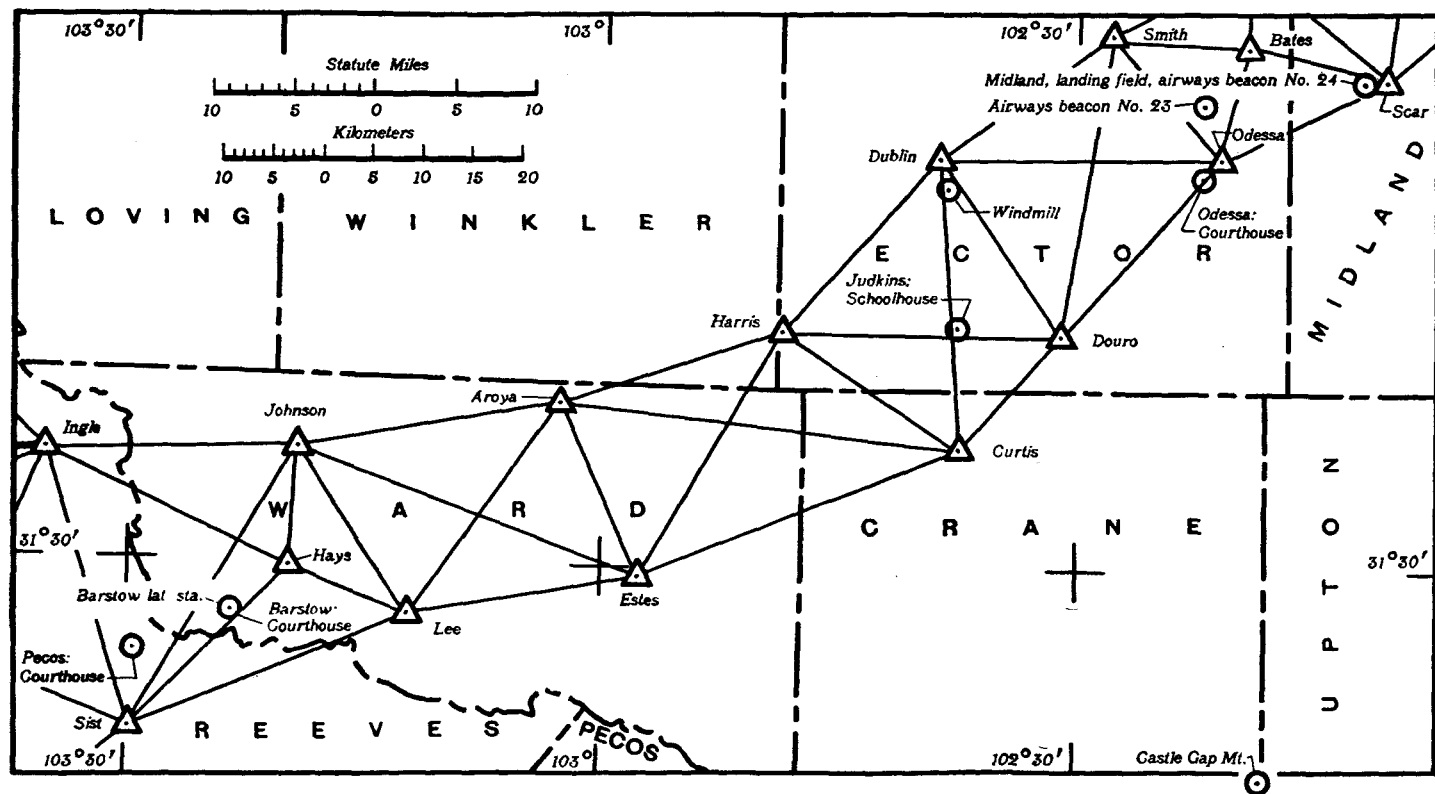


FIGURE 16.—Triangulation along the Texas-California arc.

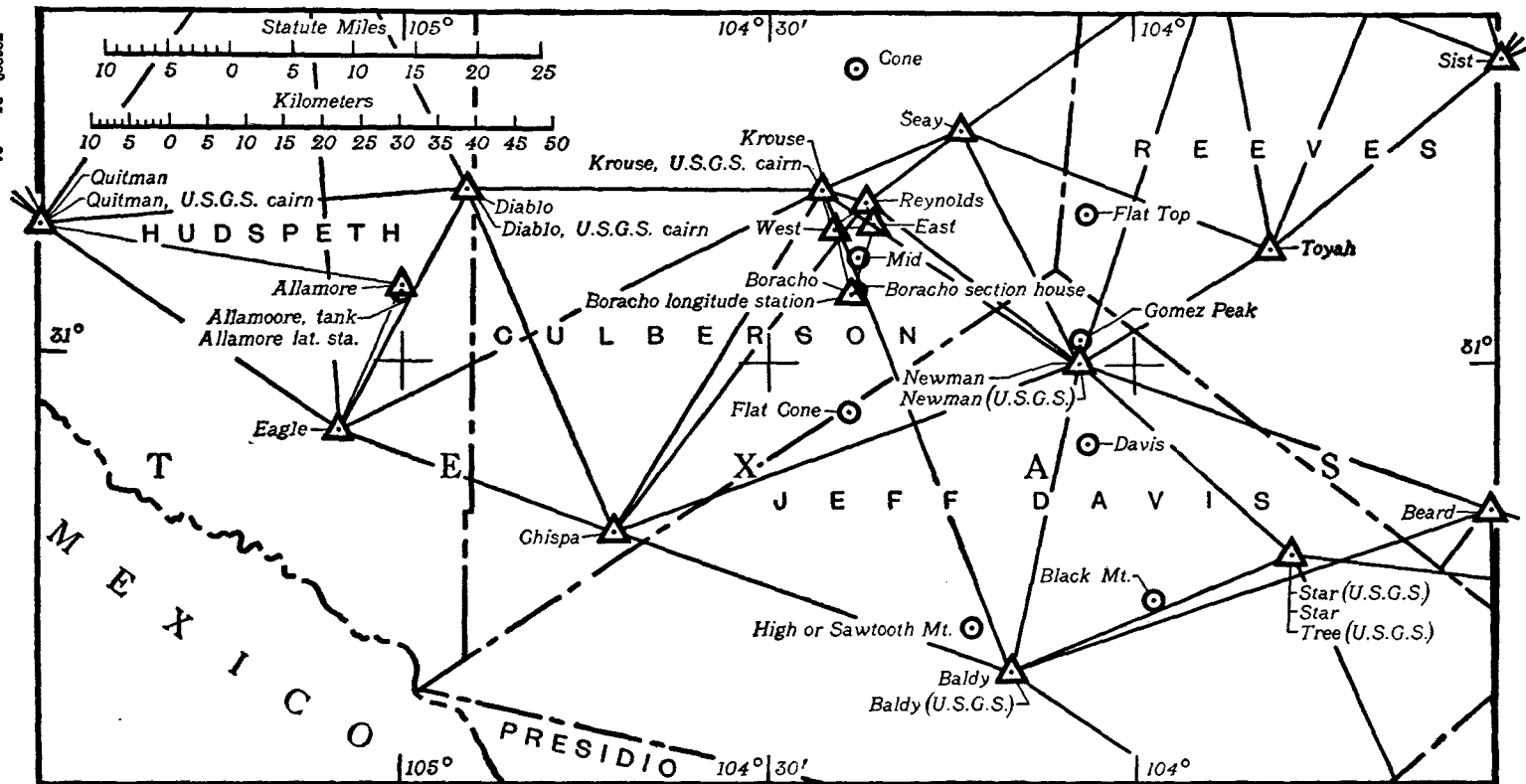


FIGURE 18.—Triangulation along the Texas-California arc, junction with the Rio Grande arc.

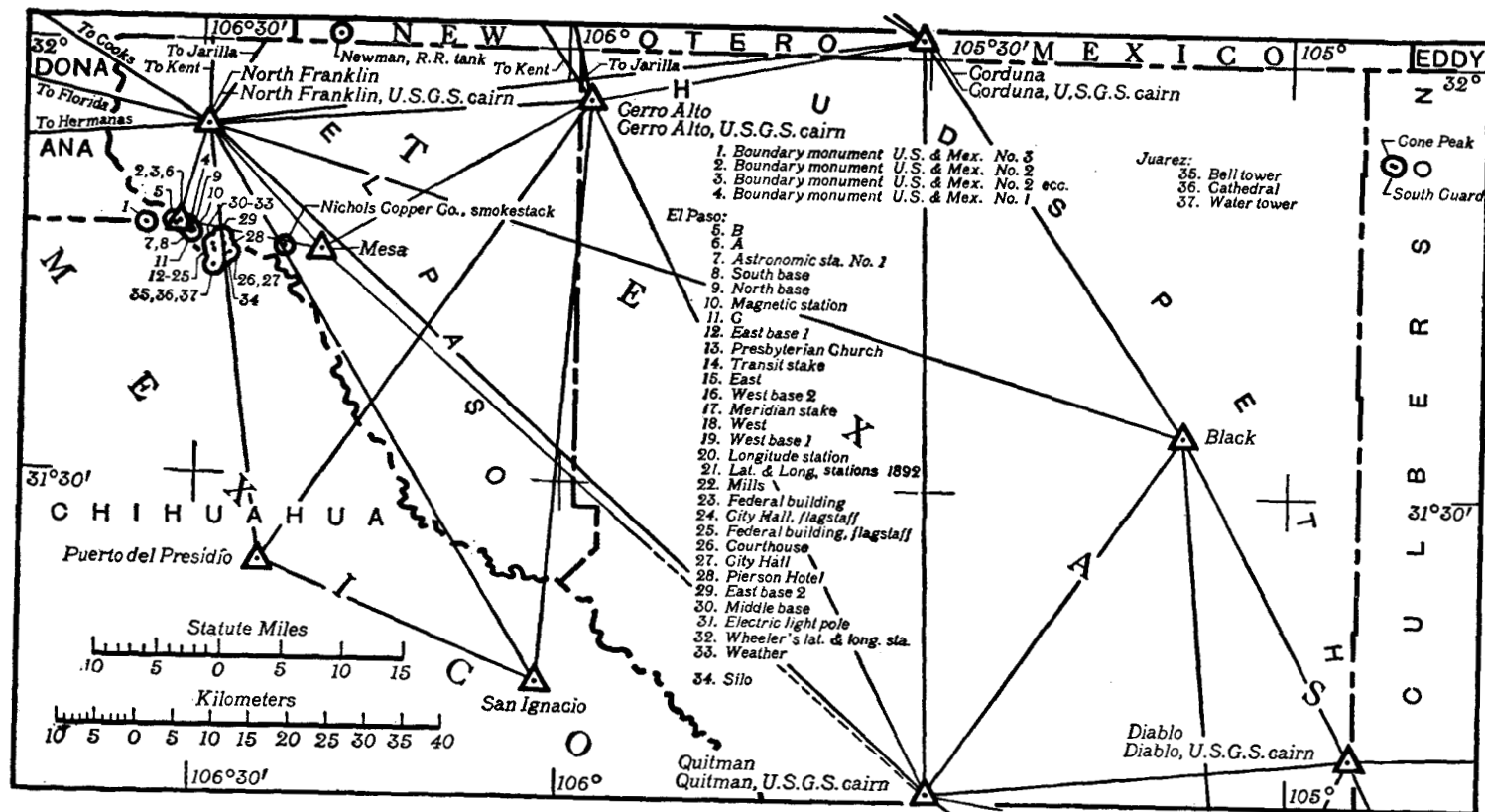


FIGURE 19.—Triangulation along the Texas-California arc.

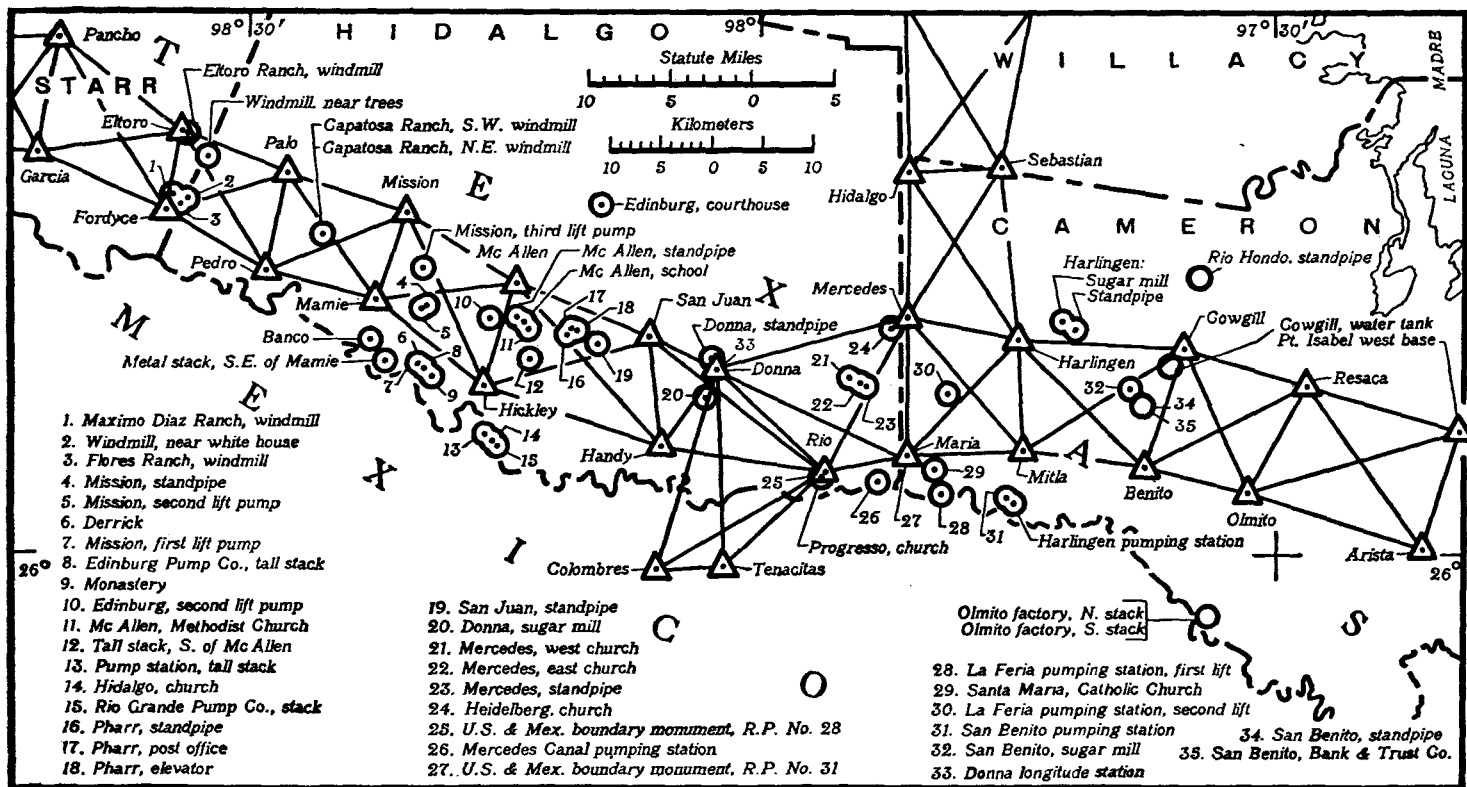


FIGURE 20.—Triangulation along the Rio Grande arc, junction with the ninety-eighth meridian arc and extension to Point Isabel.

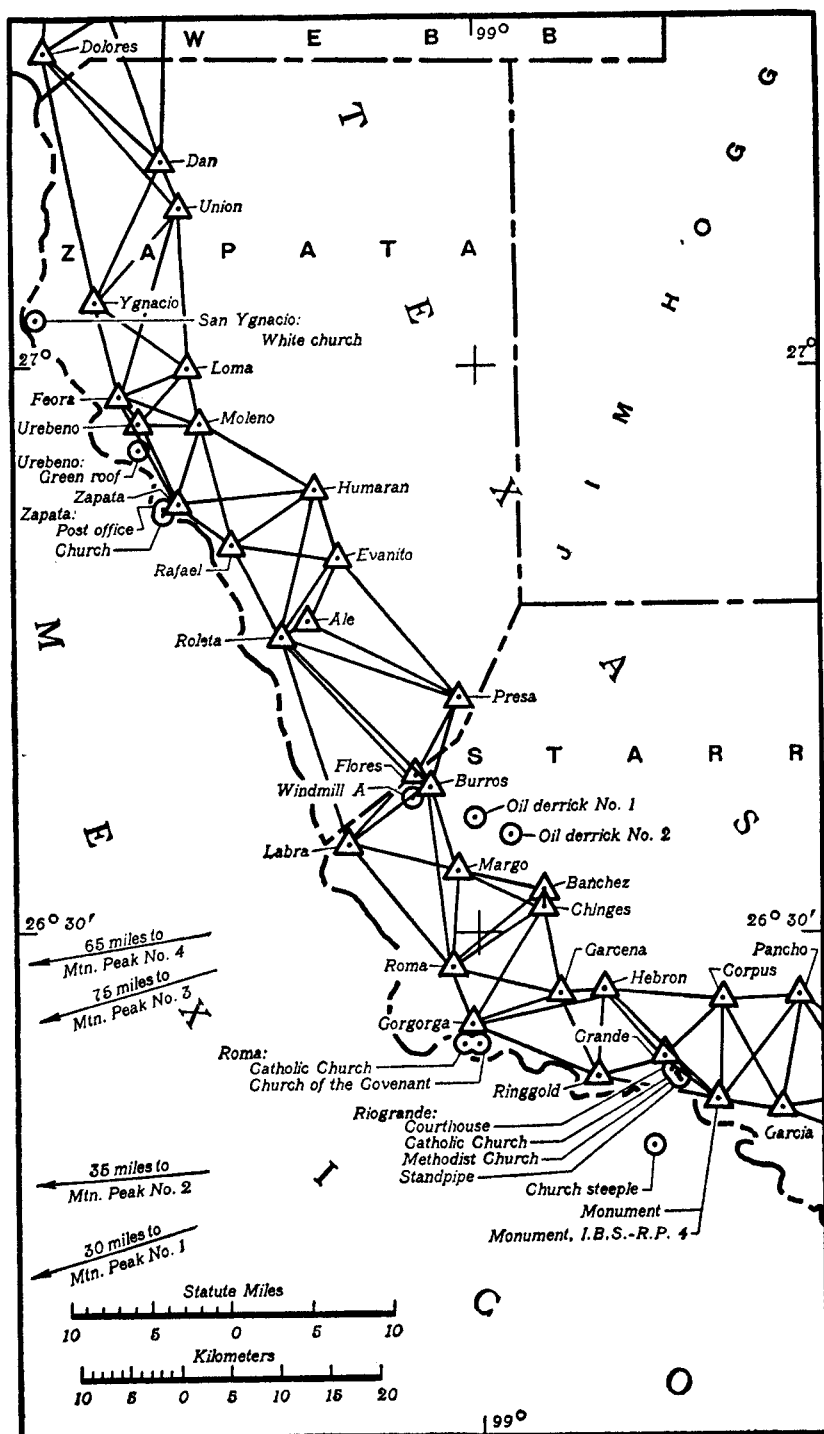


FIGURE 21.—Triangulation along the Rio Grande arc.

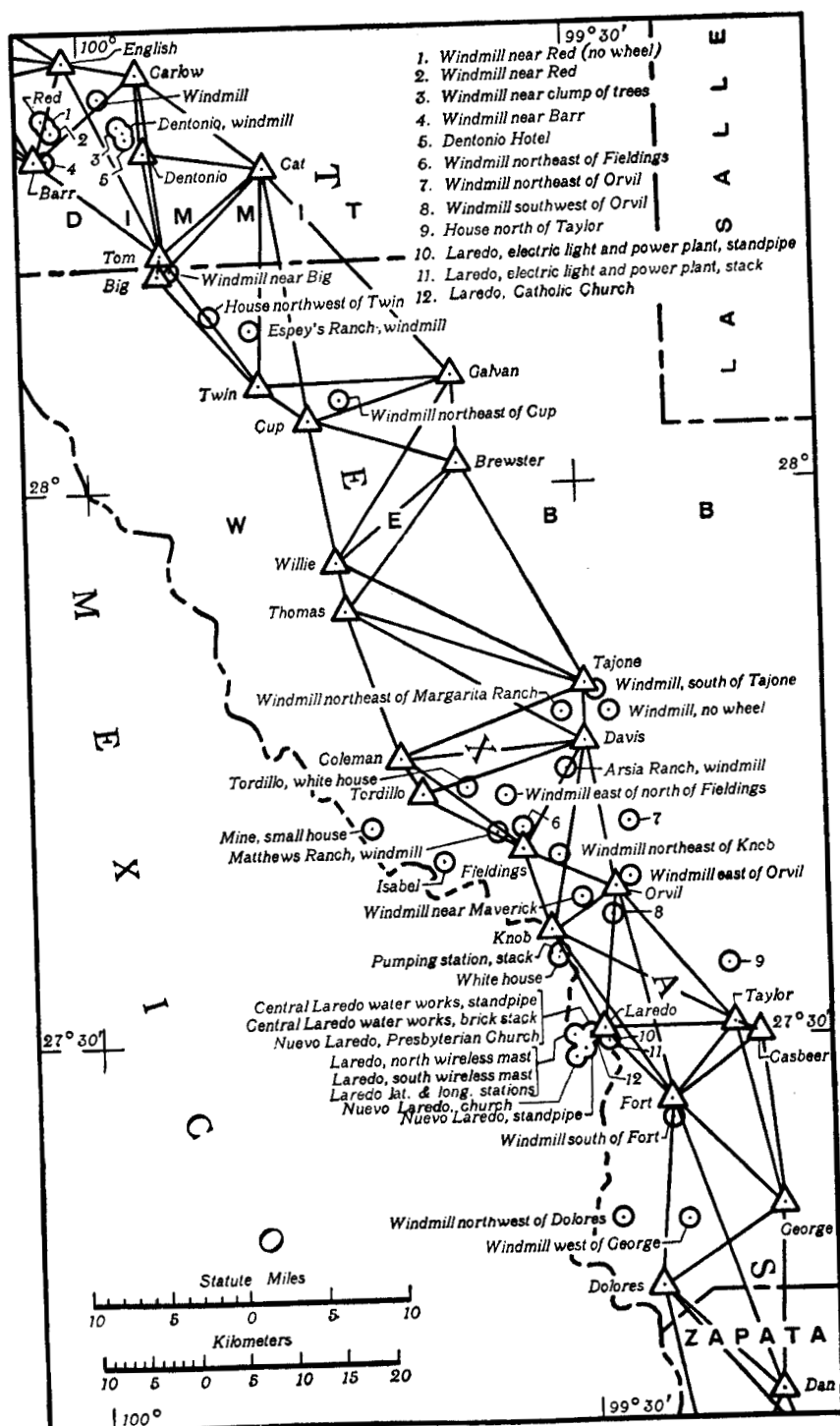


FIGURE 22.—Triangulation along the Rio Grande arc.

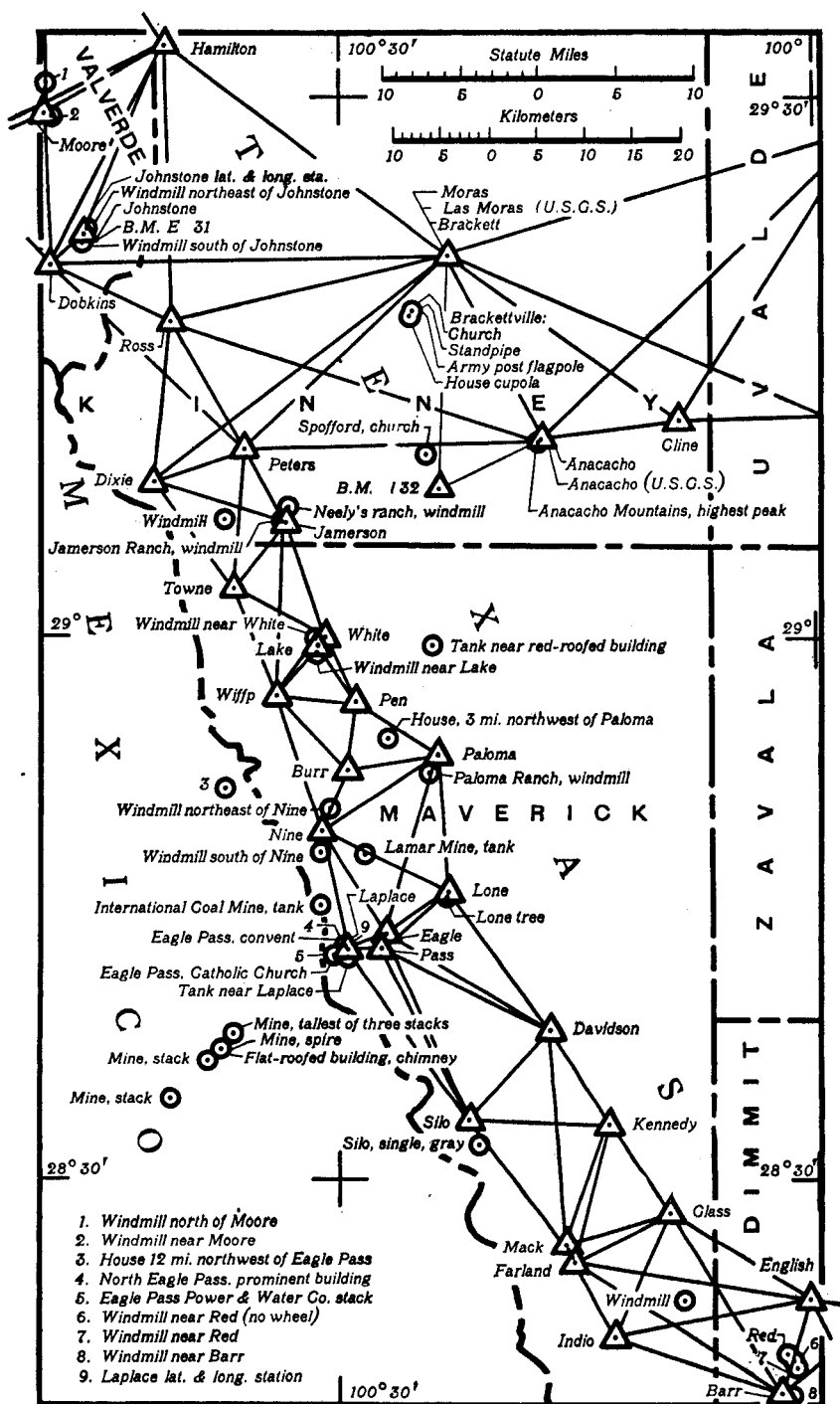


FIGURE 23.—Triangulation along the Rio Grande arc, junction with the San Antonio-Del Rio arc.

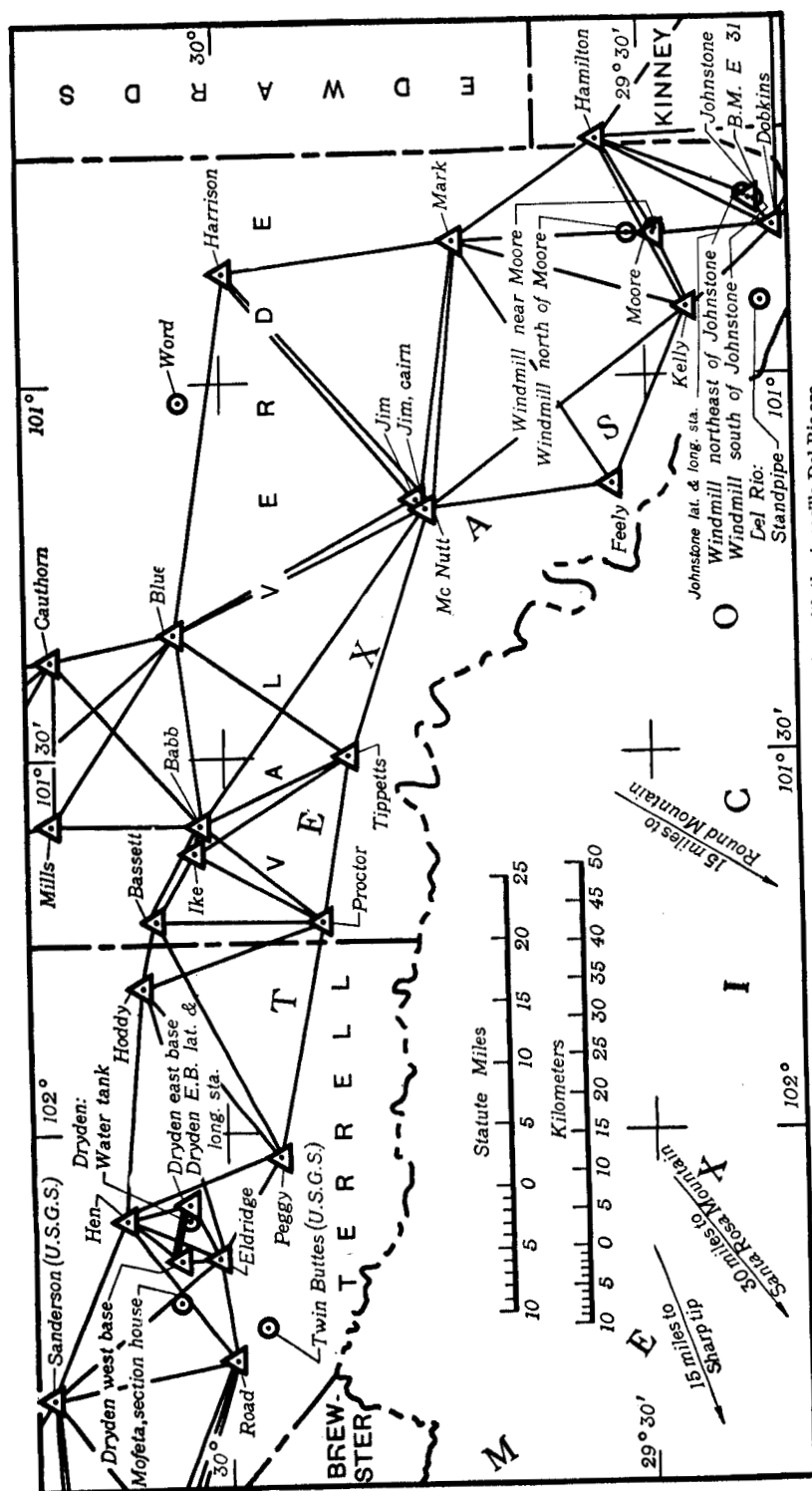


FIGURE 24.—Triangulation along the Rio Grande arc, junction with the Amarillo-Del Rio arc.

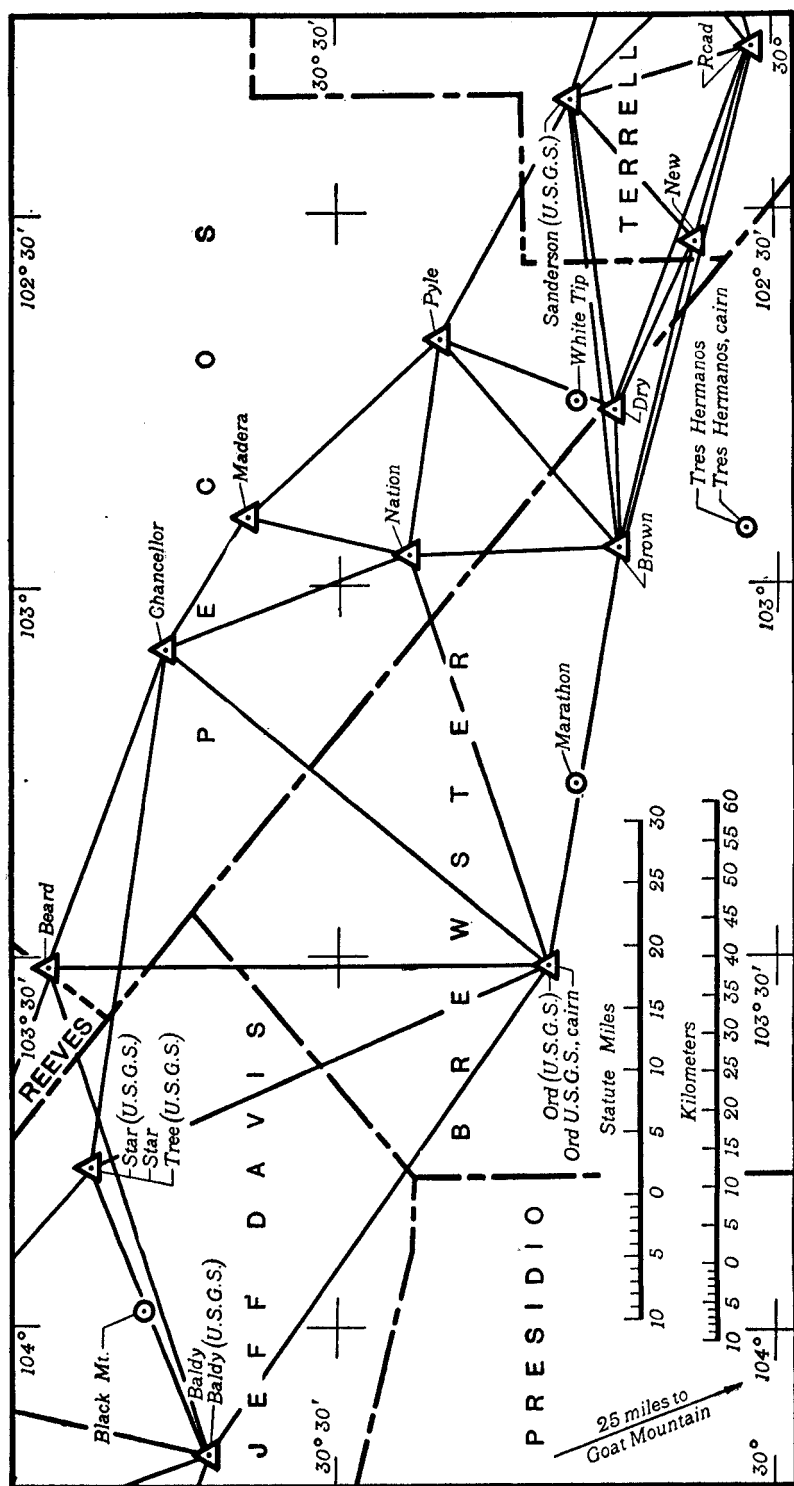


FIGURE 25.—Triangulation along the Rio Grande arc.

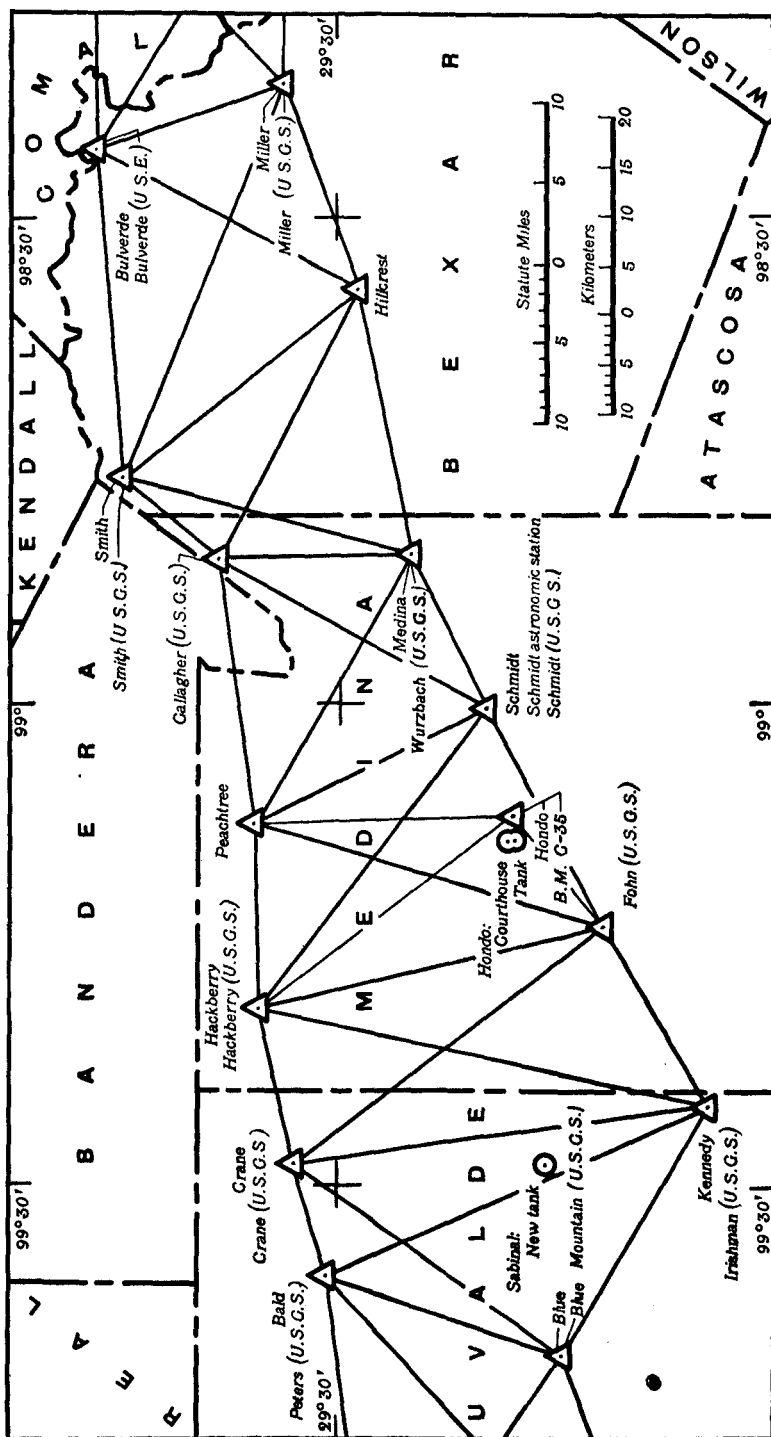


FIGURE 26.—Triangulation along the San Antonio-Del Rio arc.



FIGURE 27.—Triangulation along the San Antonio-Del Rio arc, junction with the Rio Grande arc.

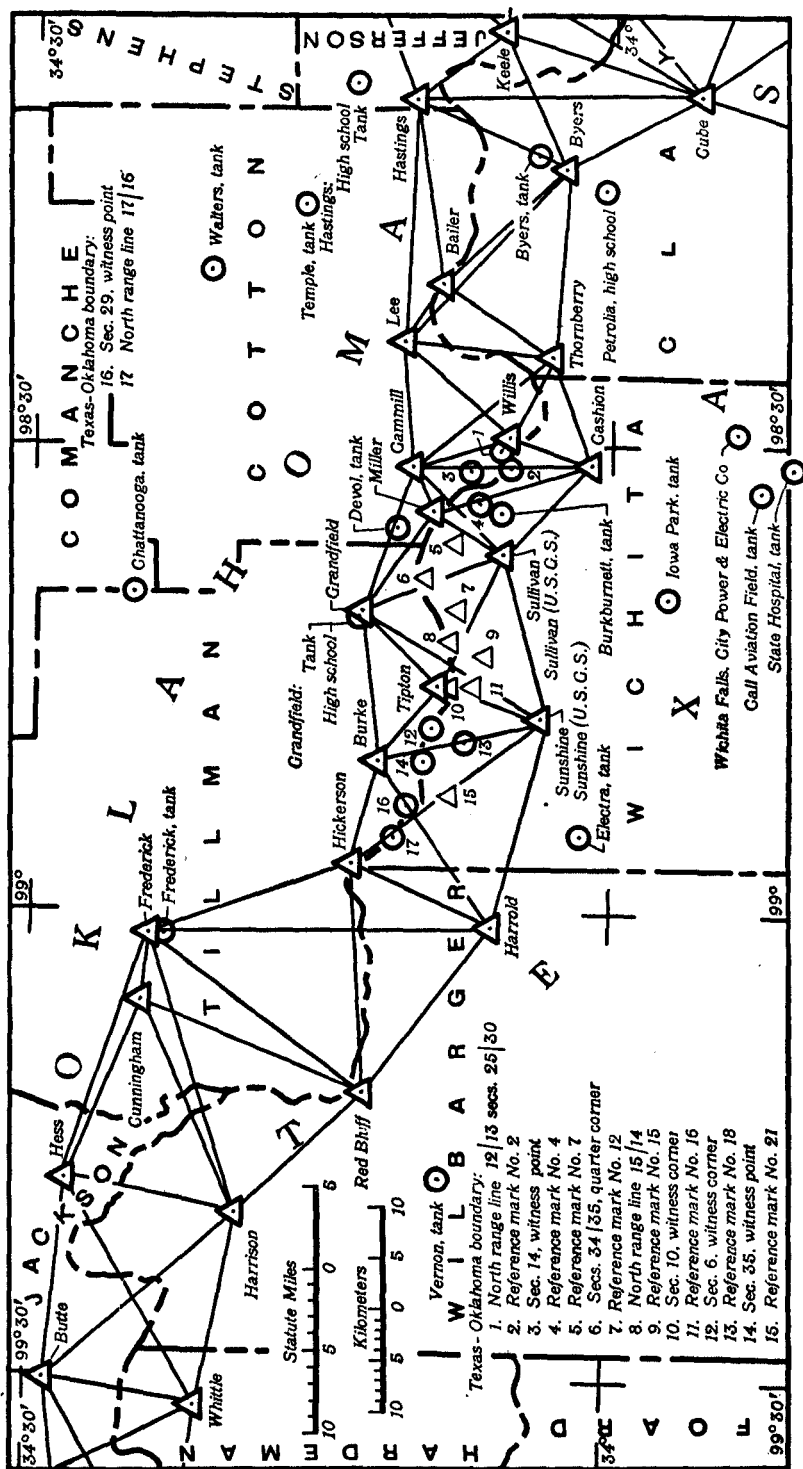


FIGURE 28.—Triangulation along the Red River boundary arc, junction with the ninety-eighth meridian arc.

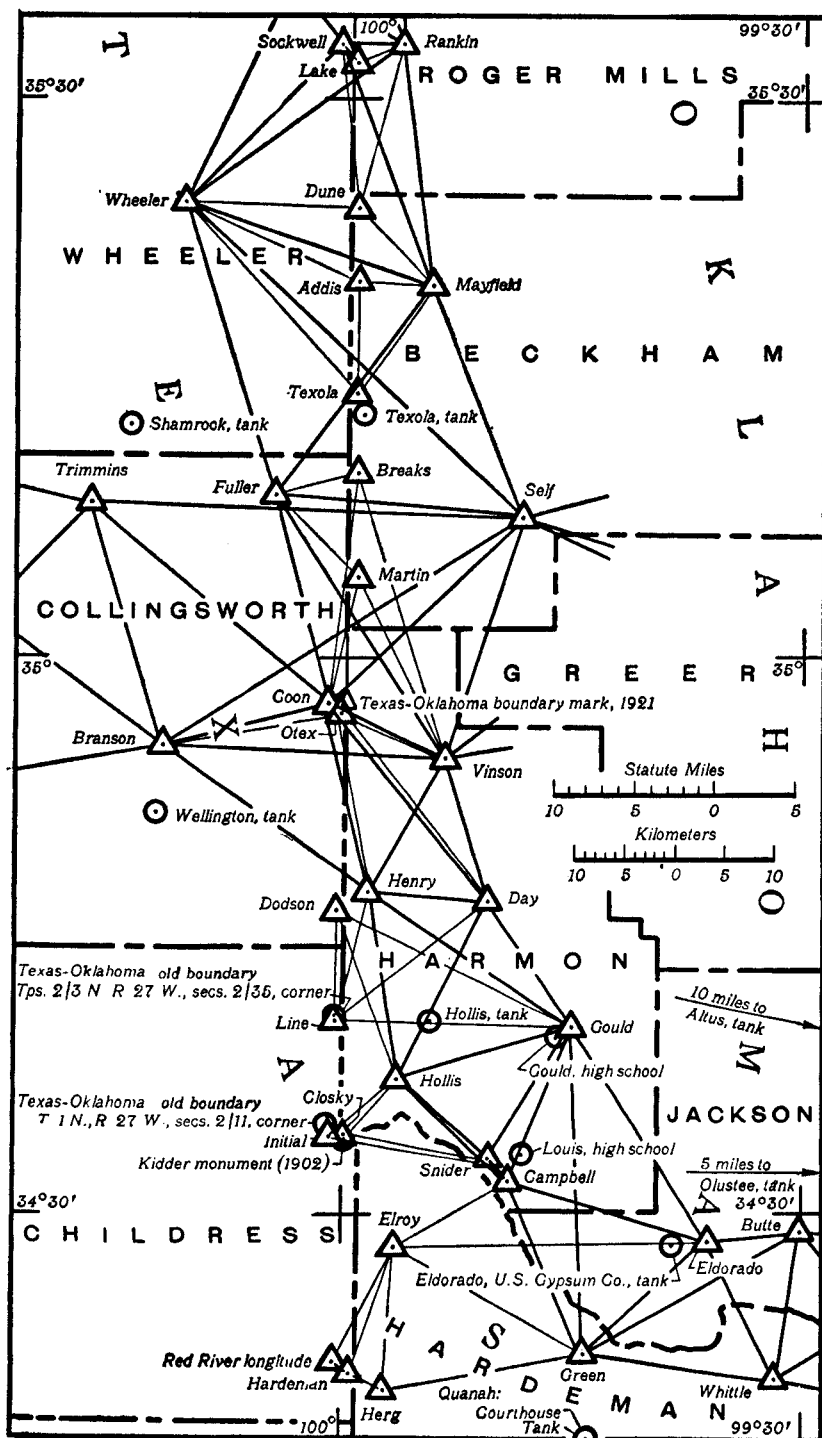


FIGURE 29.—Triangulation along the one-hundredth meridian boundary arc, junction with the Red River boundary arc and the thirty-fifth parallel arc.

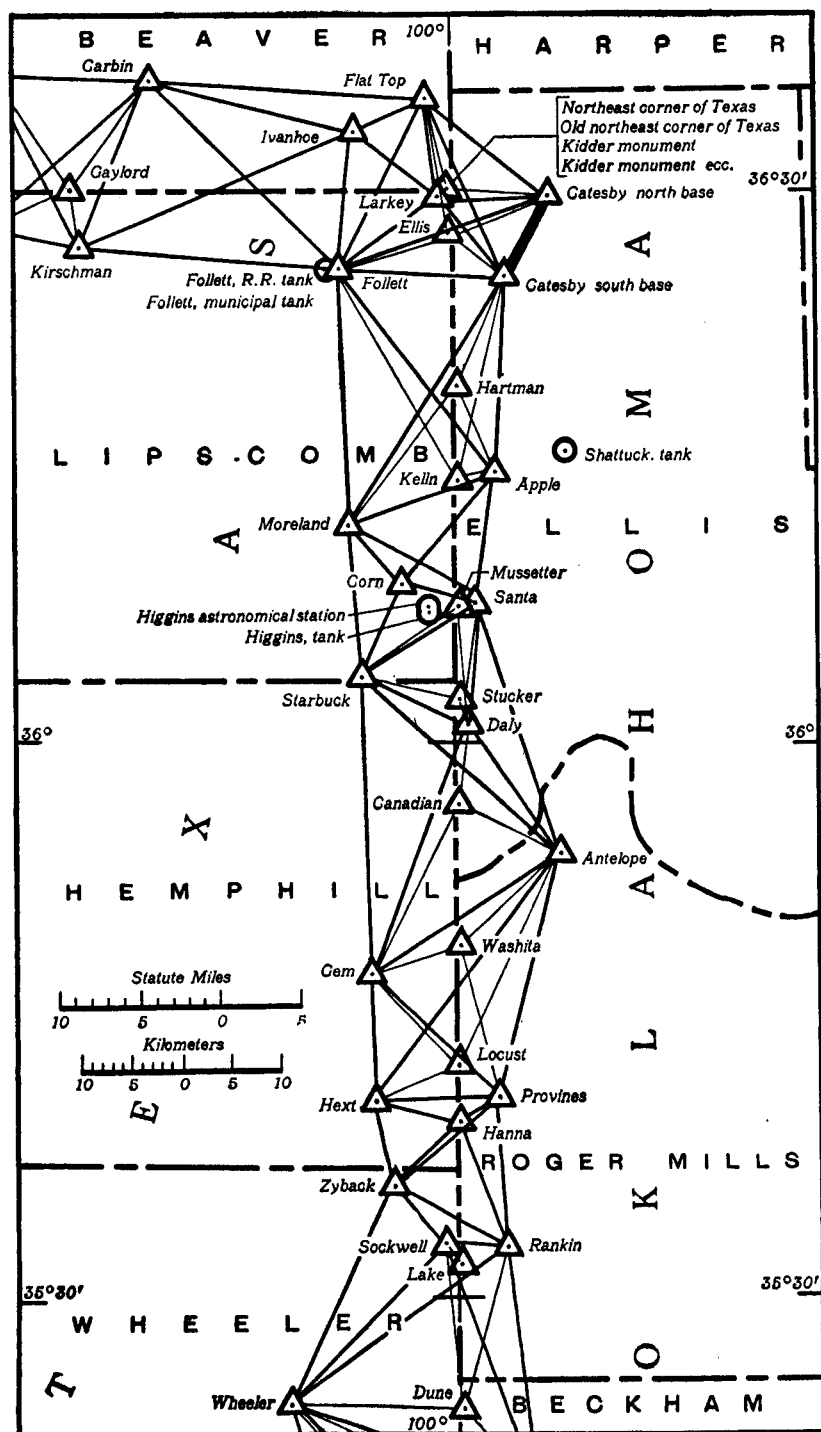


FIGURE 30.—Triangulation along the one-hundredth meridian boundary arc, junction with the Texas-Oklahoma boundary arc (parallel of 36°30').

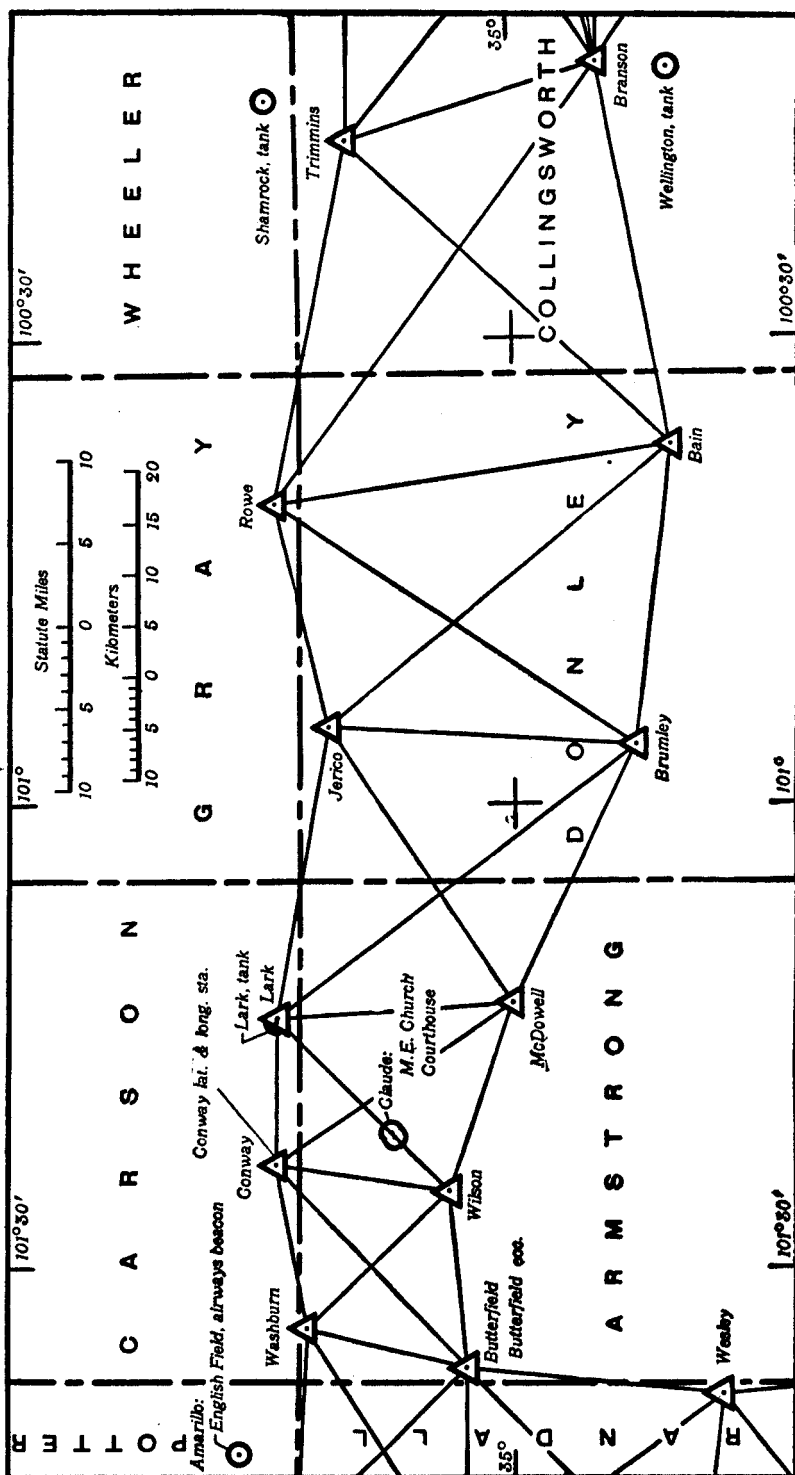


FIGURE 31.—Triangulation along the thirty-fifth parallel arc, junction with the Amarillo-Del Rio arc.

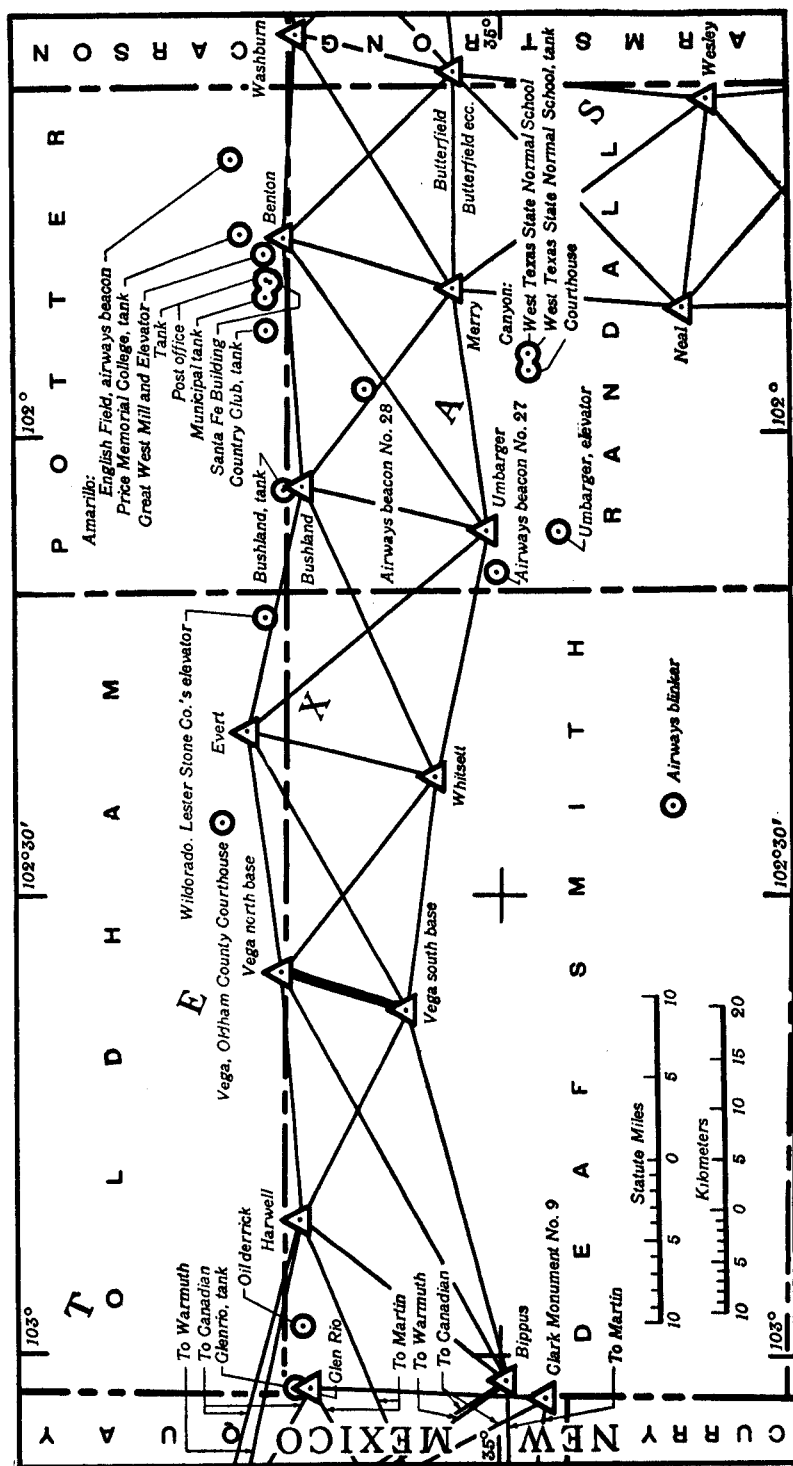


FIGURE 32.—Triangulation along the thirty-fifth parallel arc, junction with the Amarillo-Del Rio are.

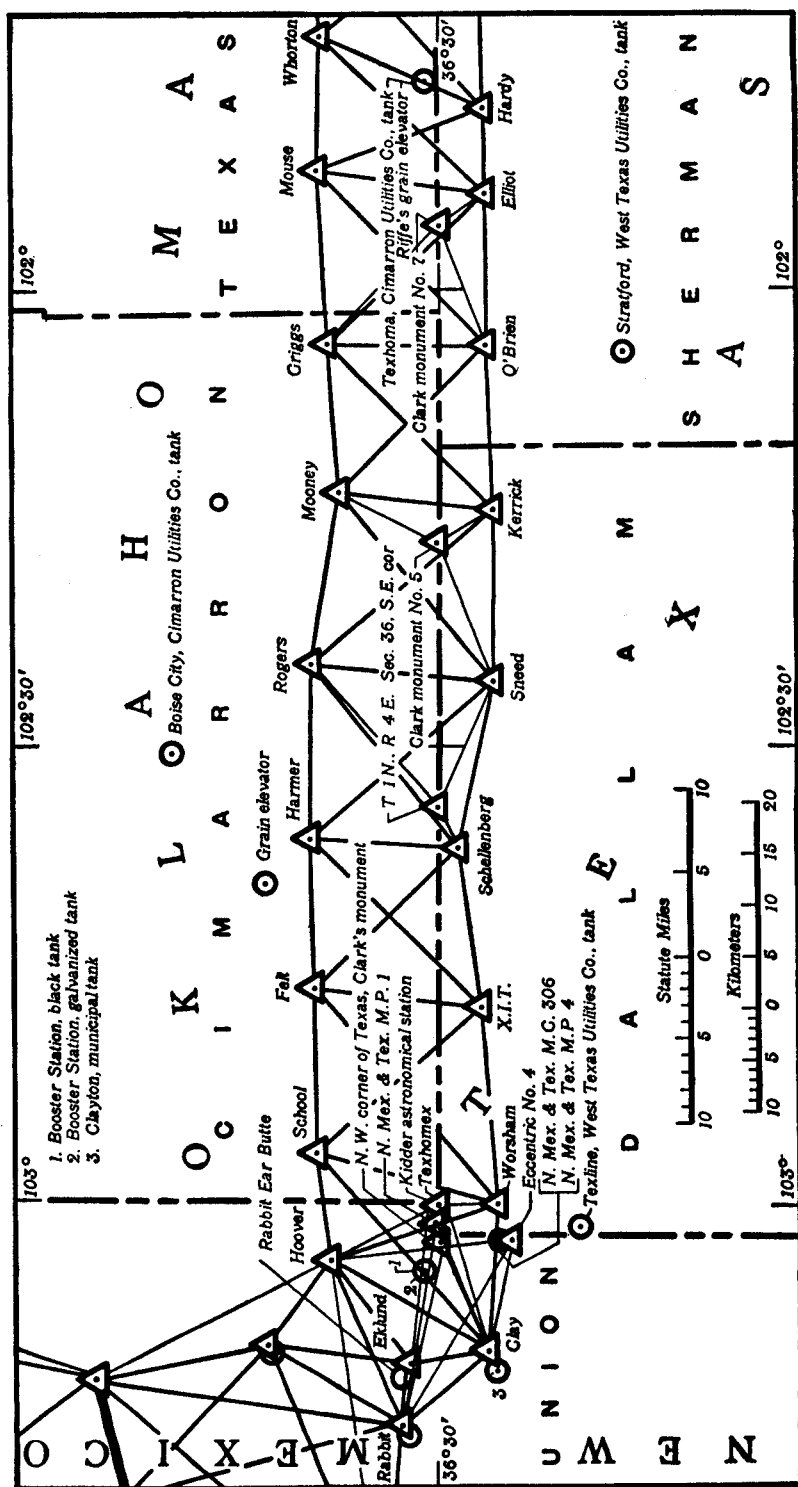


FIGURE 33.—Triangulation along the Texas-Oklahoma boundary arc (parallel of 36°30').

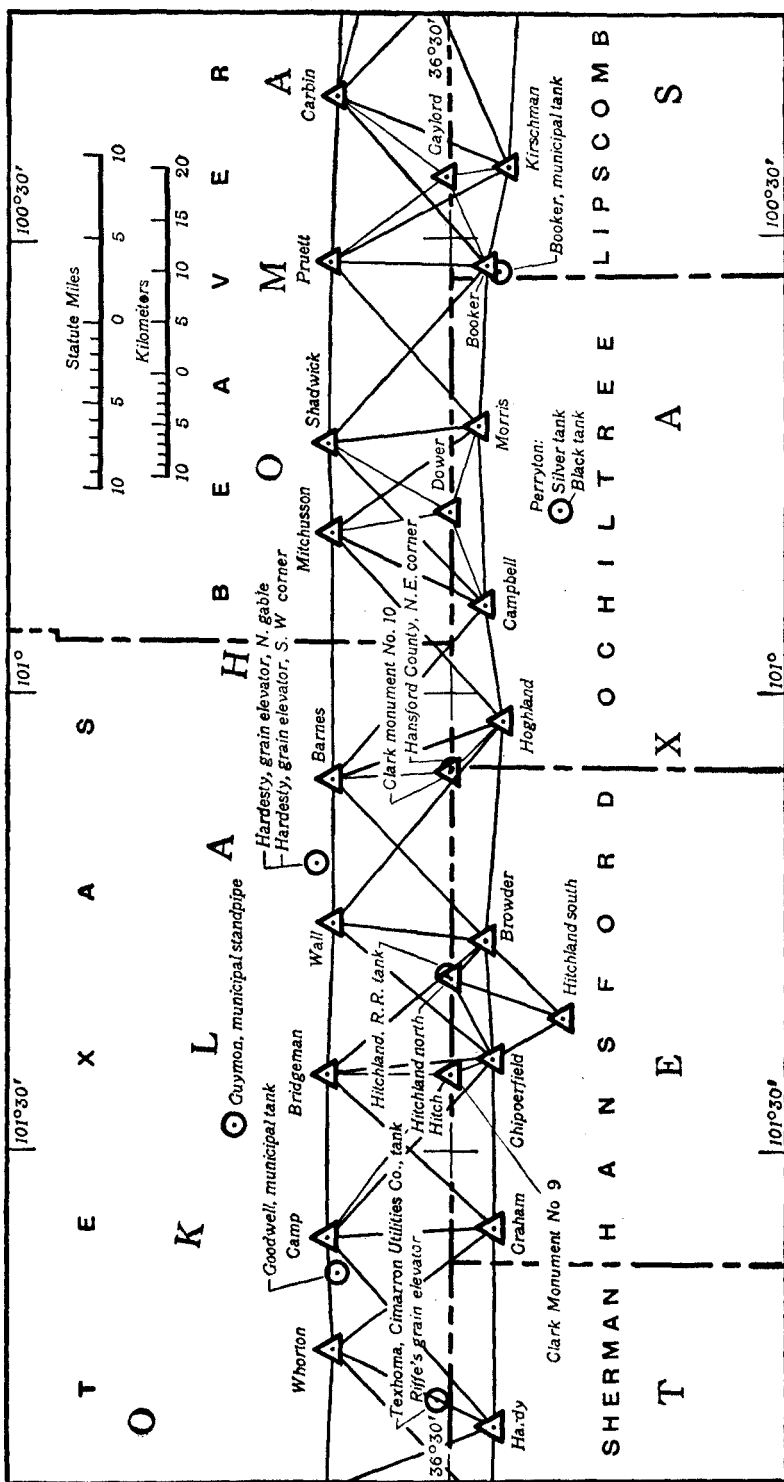


FIGURE 34.—Triangulation along the Texas-Oklahoma boundary arc (parallel of 36°30').

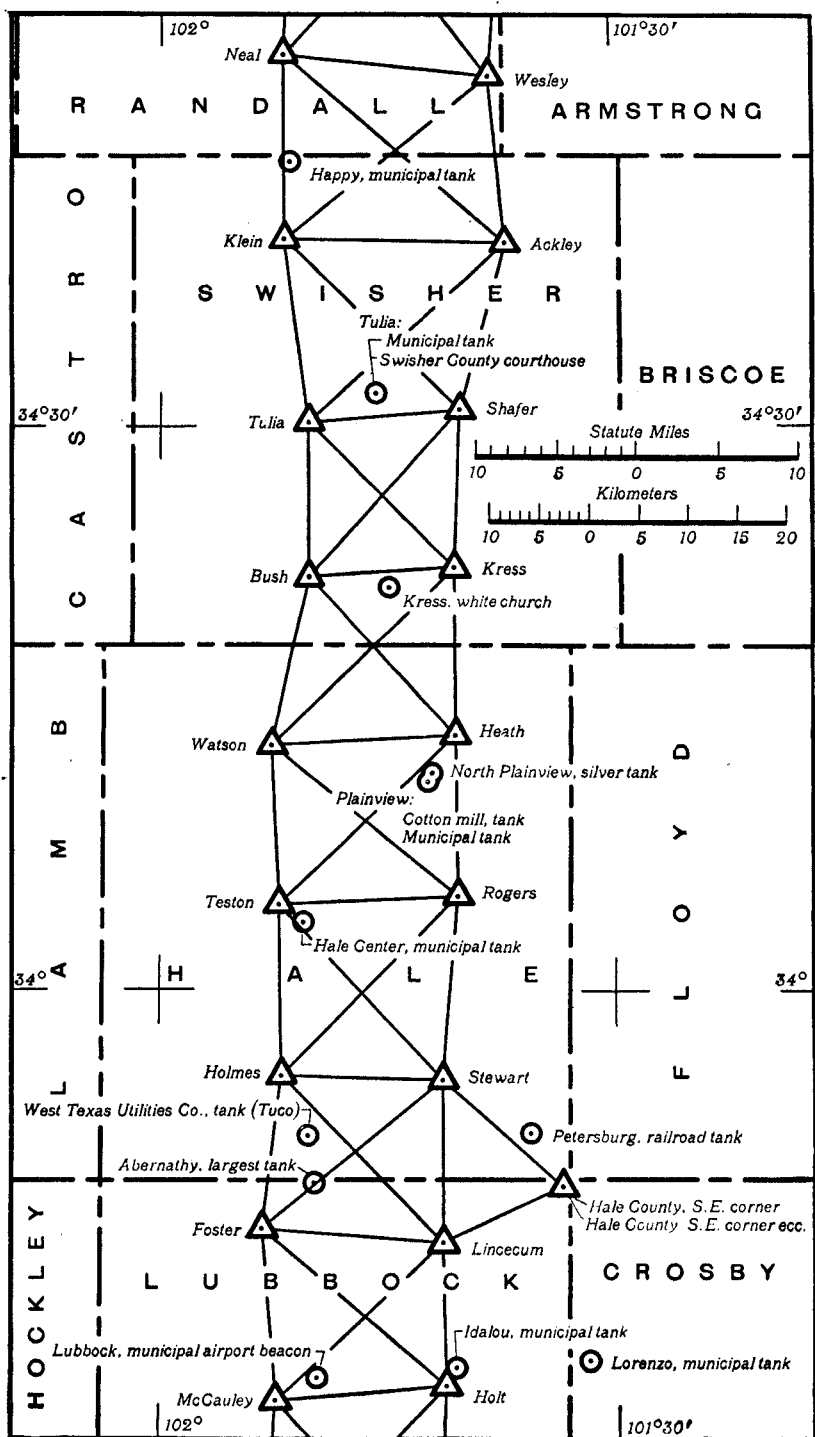


FIGURE 35.—Triangulation along the Amarillo-Del Rio arc.

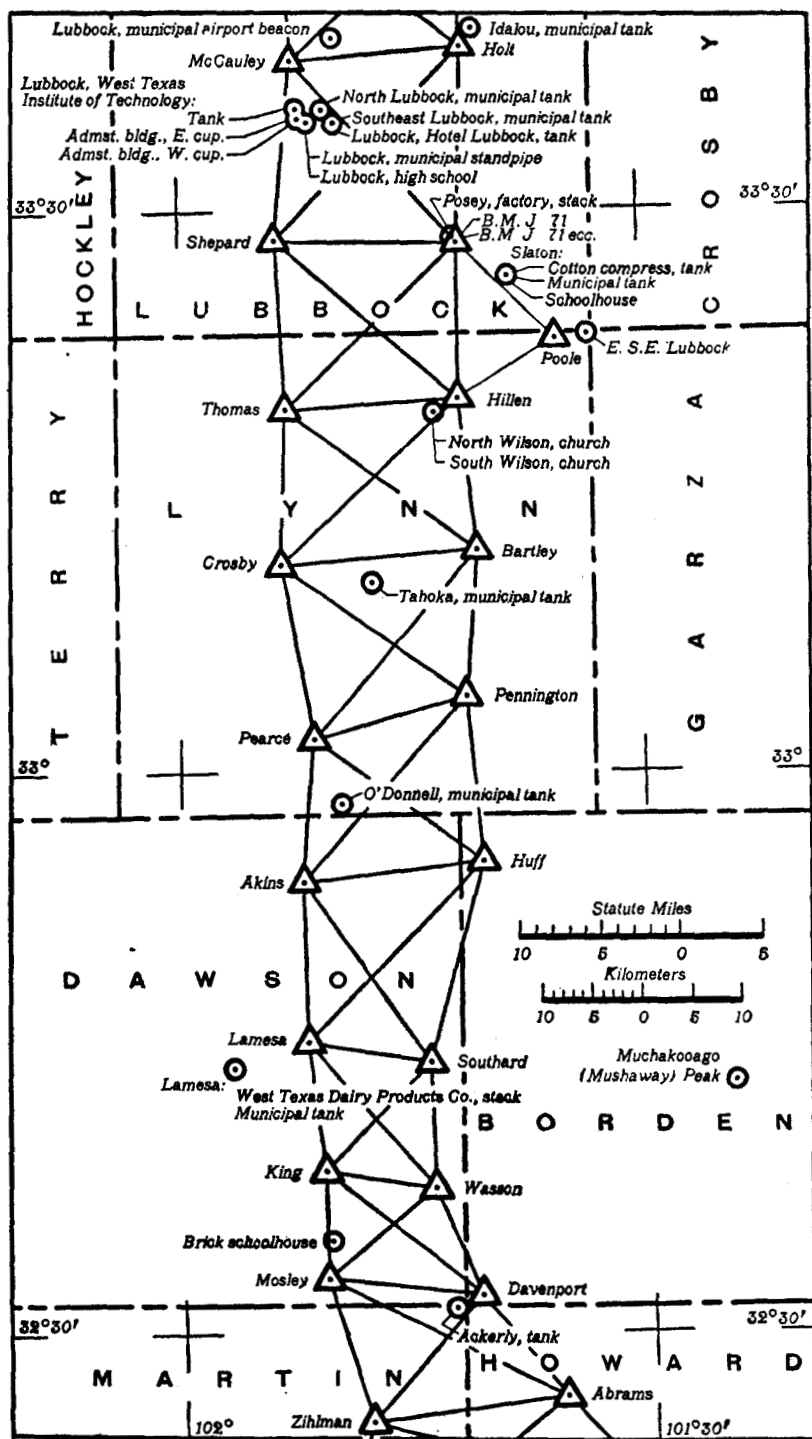


FIGURE 36.—Triangulation along the Amarillo-Del Rio arc.

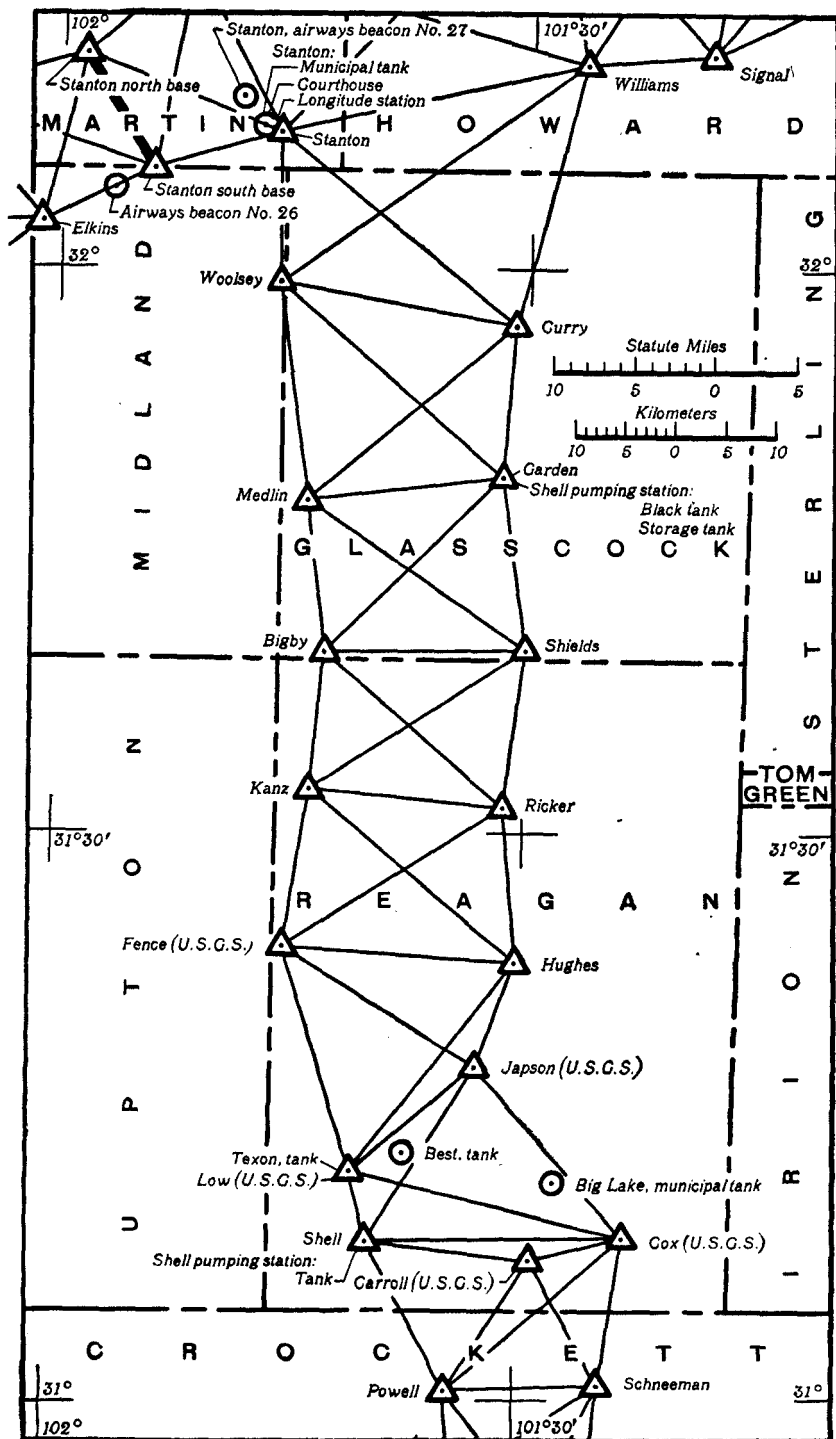


FIGURE 37.—Triangulation along the Amarillo-Del Rio arc, junction with the Texas-California arc.

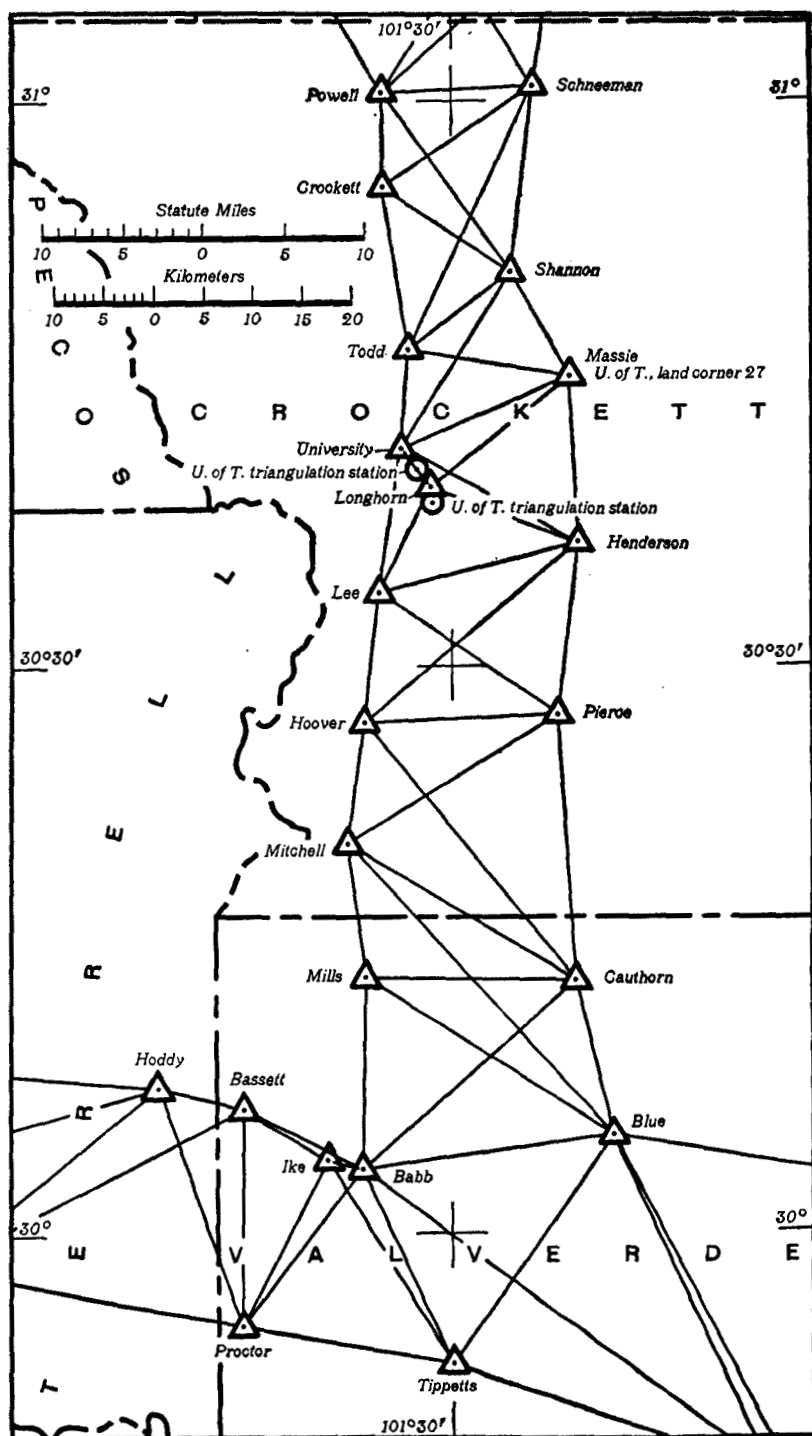


FIGURE 38.—Triangulation along the Amarillo-Del Rio arc, junction with the Rio Grande arc.

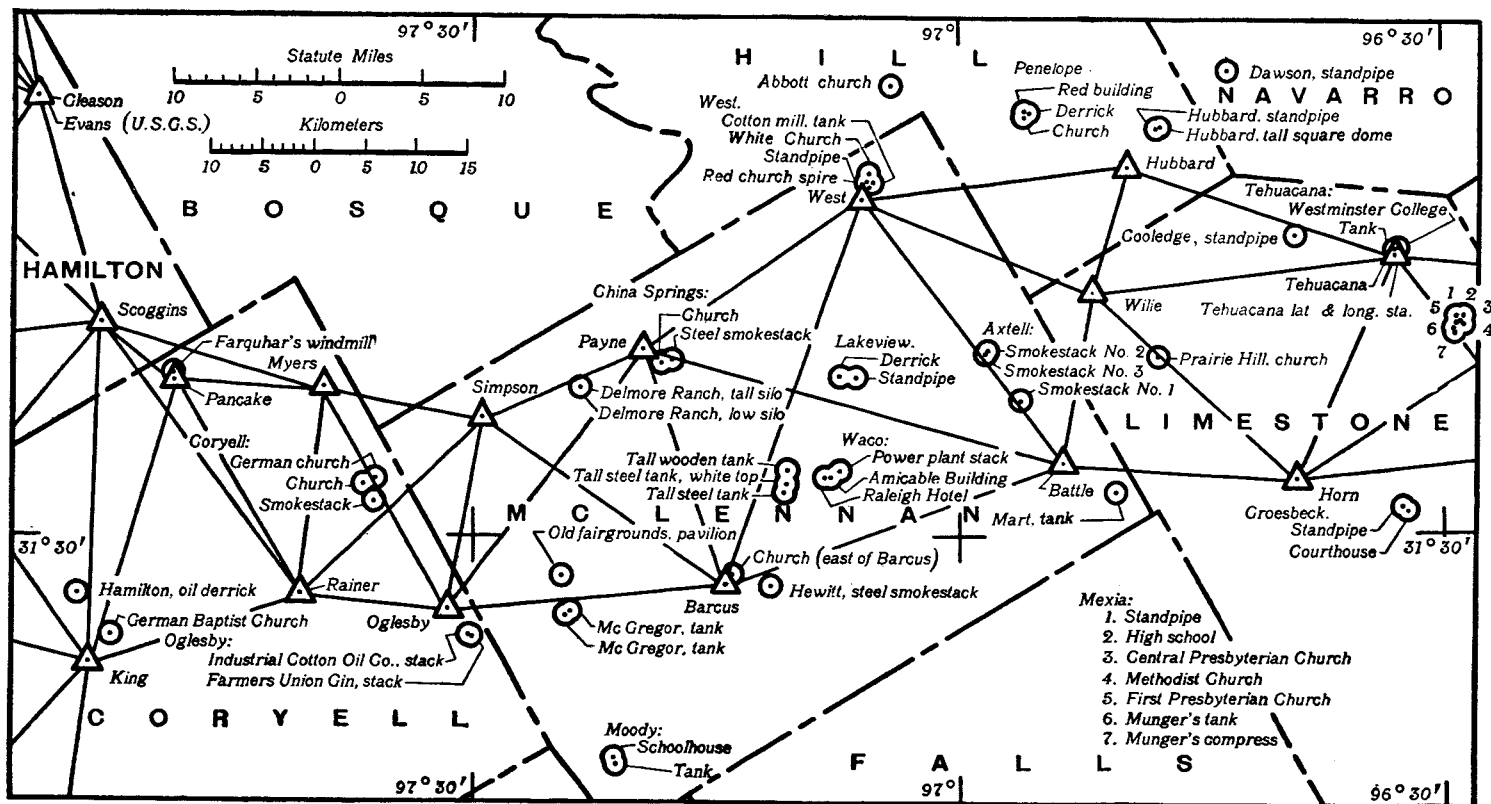


FIGURE 39.—Triangulation along the Waco-Mansfield arc, junction with the ninety-eighth meridian arc.

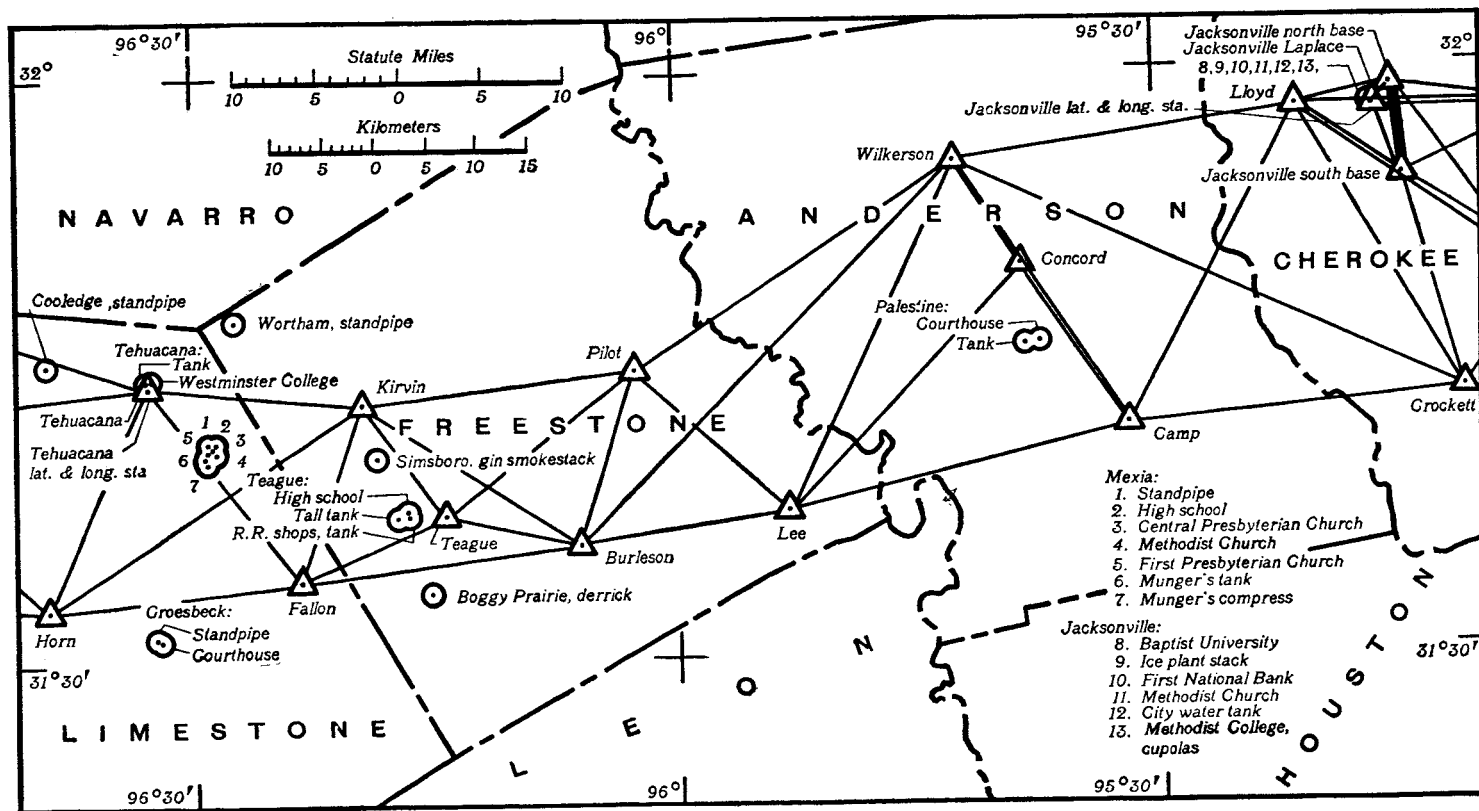


FIGURE 40.—Triangulation along the Waco-Mansfield arc.

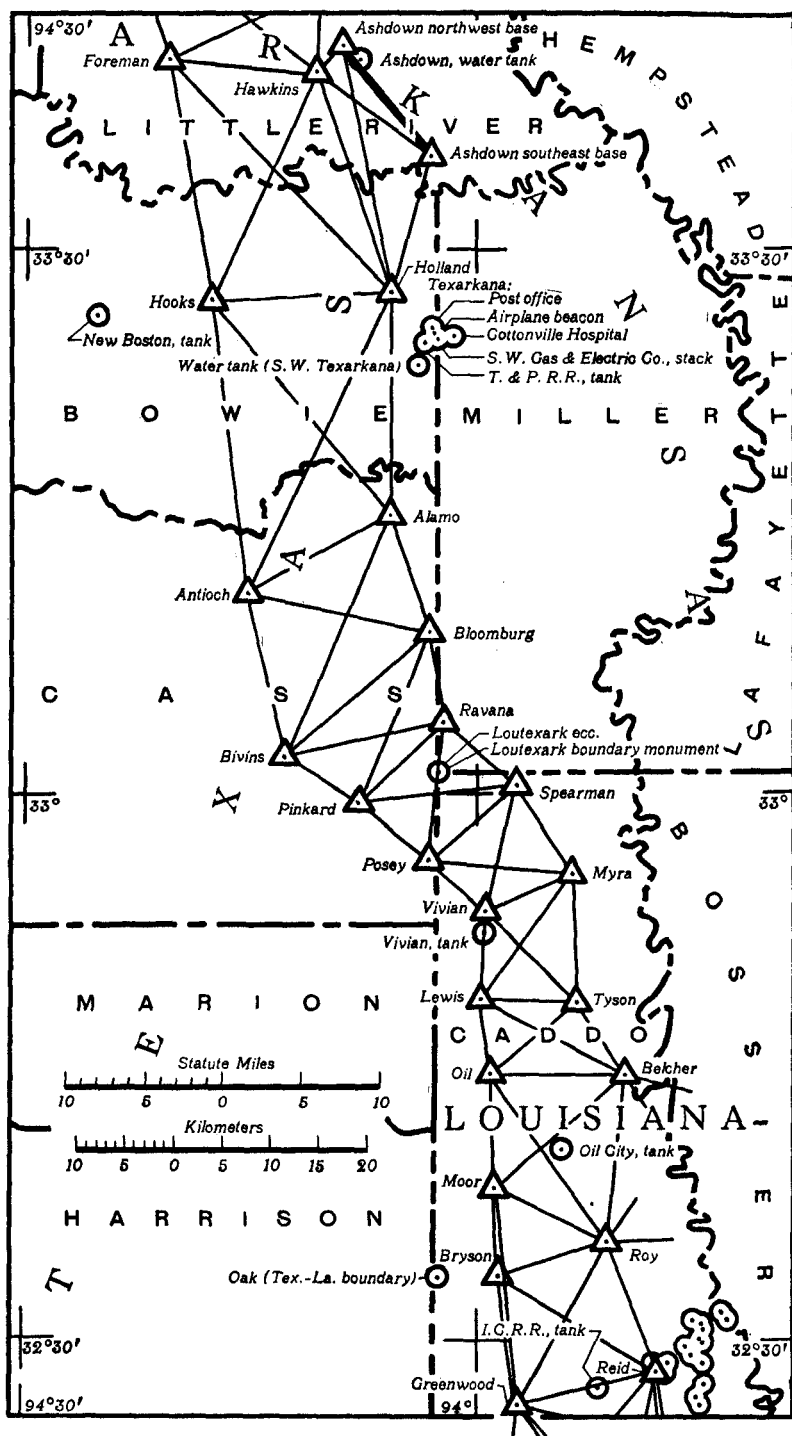


FIGURE 42.—Triangulation along the ninety-fourth meridian arc.

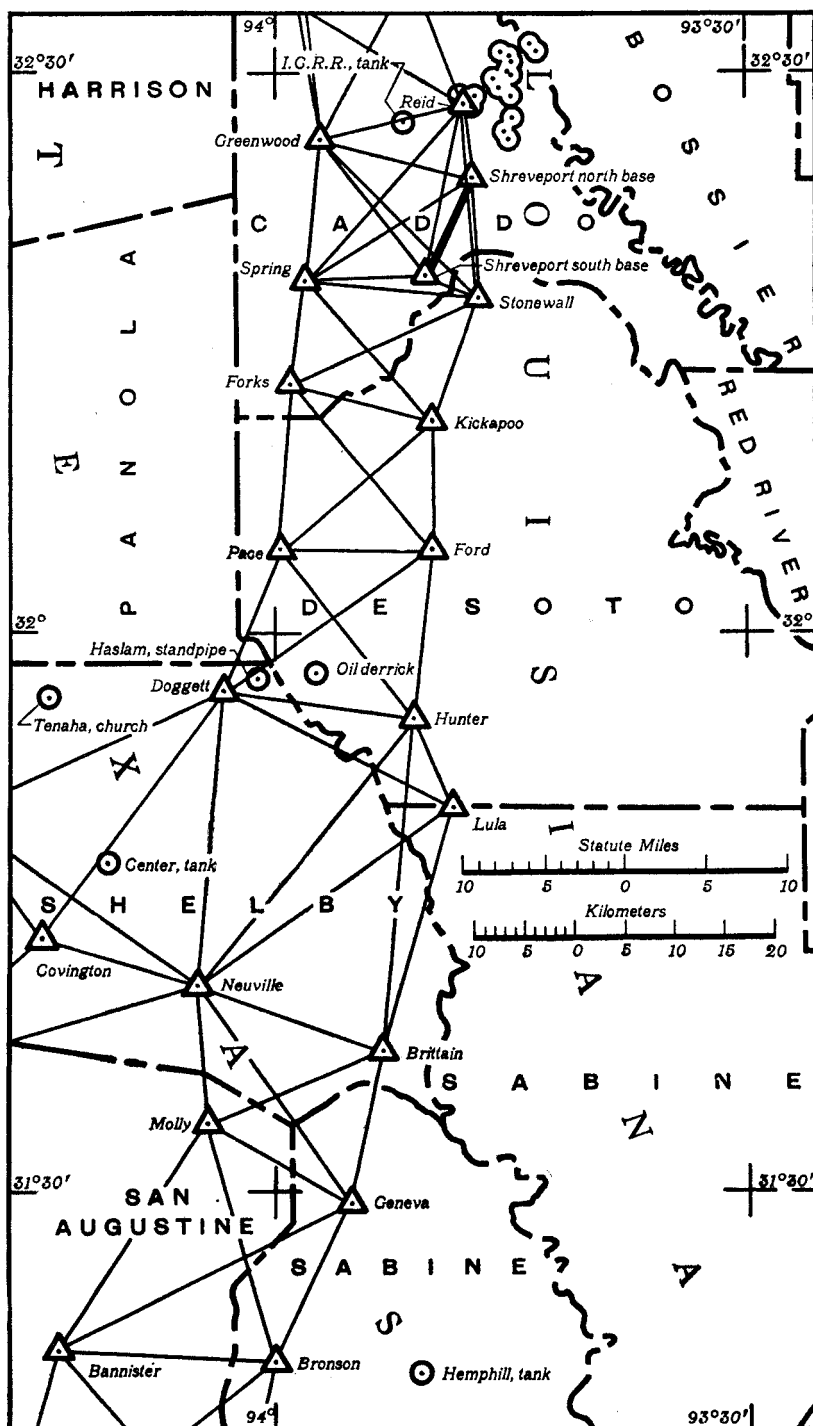


FIGURE 43.—Triangulation along the ninety-fourth meridian arc, junction with the Waco-Mansfield arc.

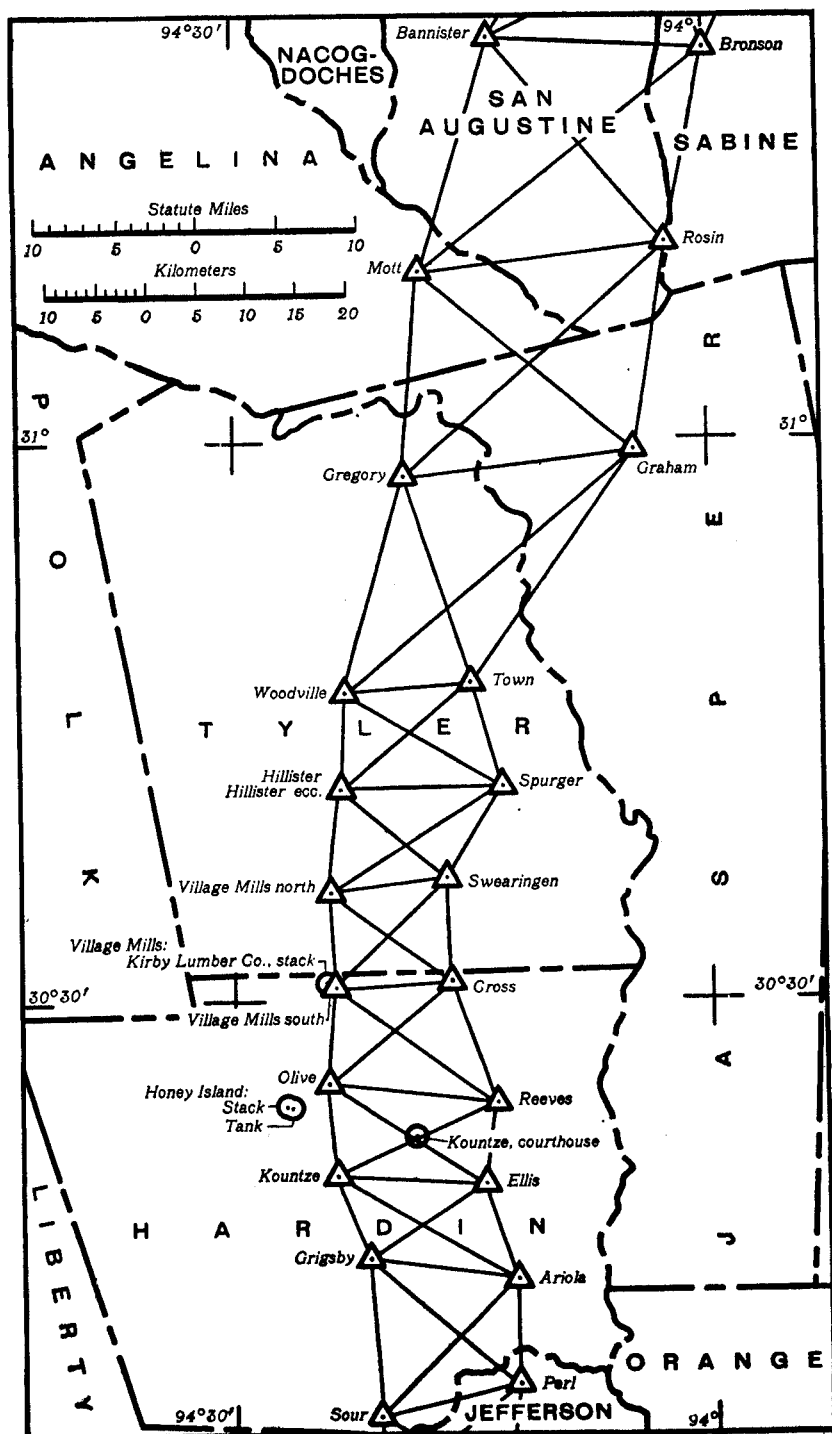


FIGURE 44.—Triangulation along the ninety-fourth meridian arc.

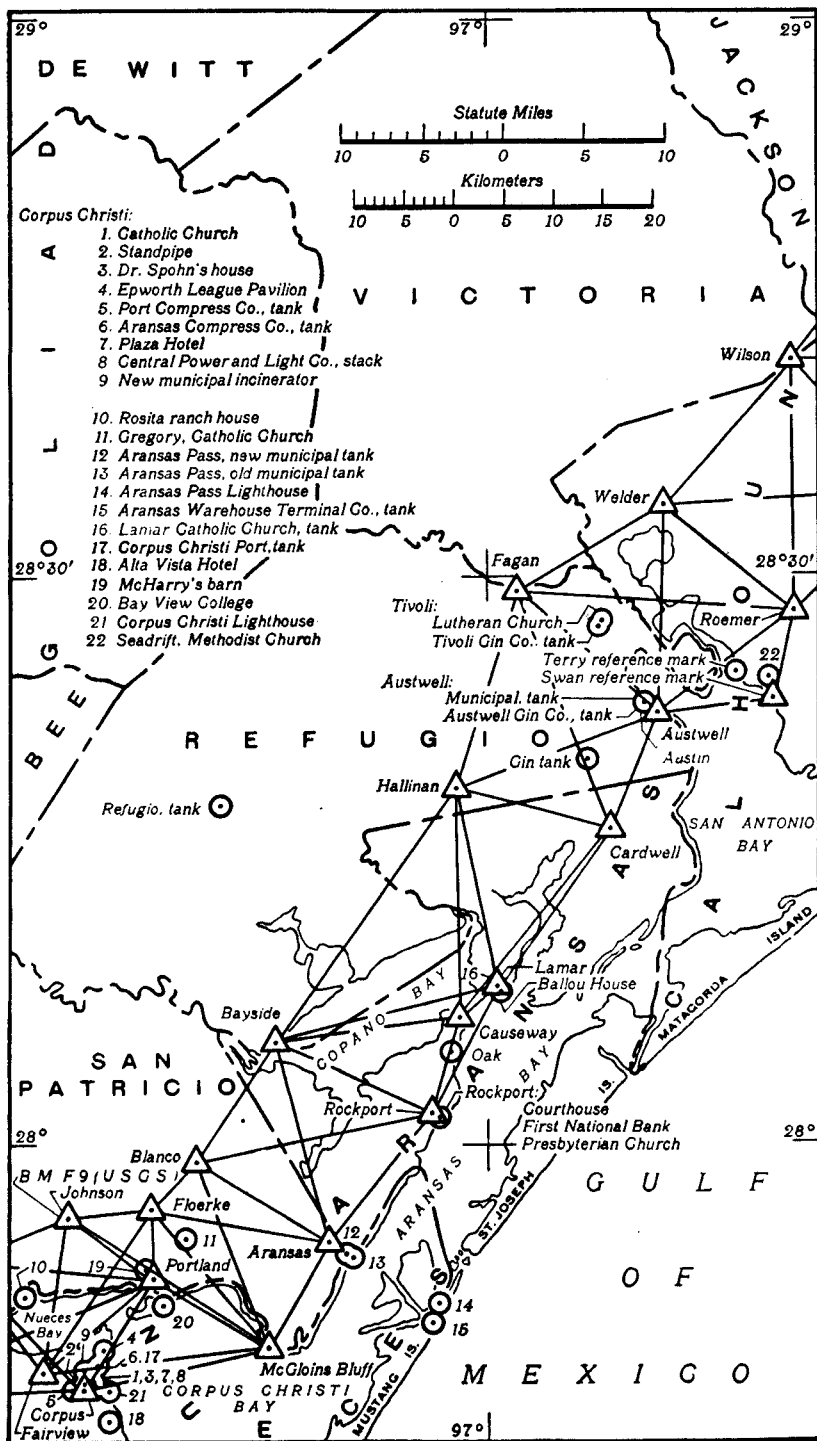


FIGURE 45.—Triangulation along the Gulf Coast arc.

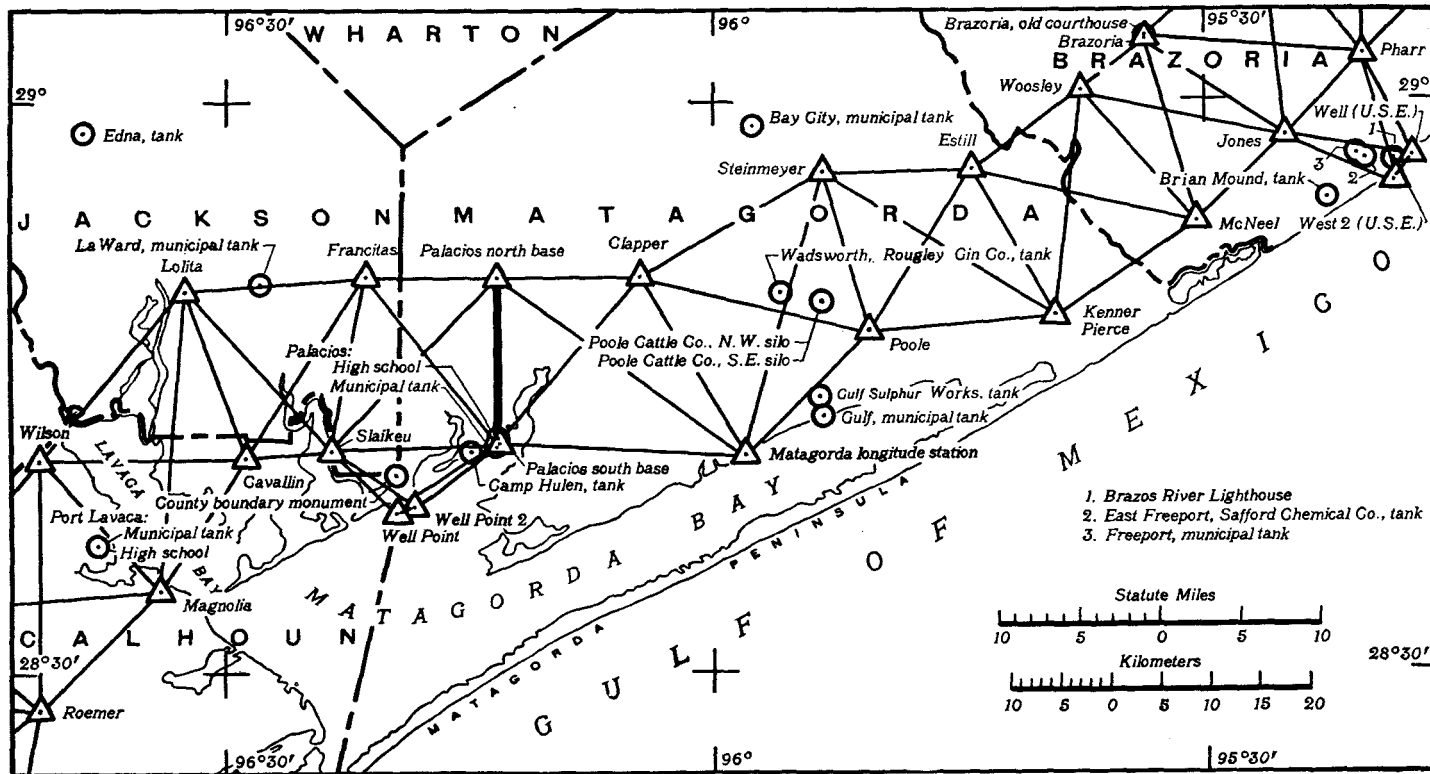


FIGURE 46.—Triangulation along the Gulf Coast arc.

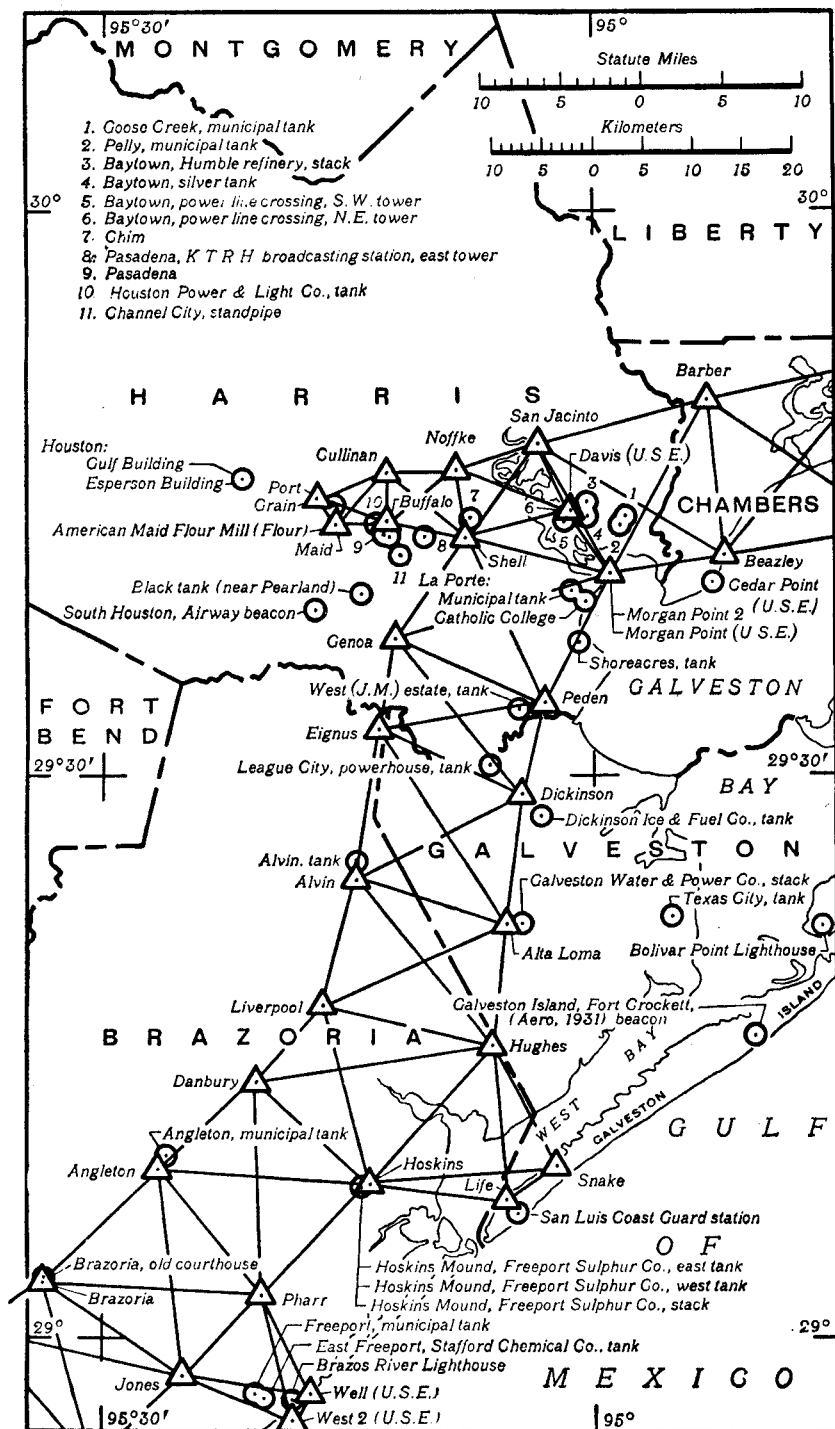


FIGURE 47.—Triangulation along the Gulf Coast arc.

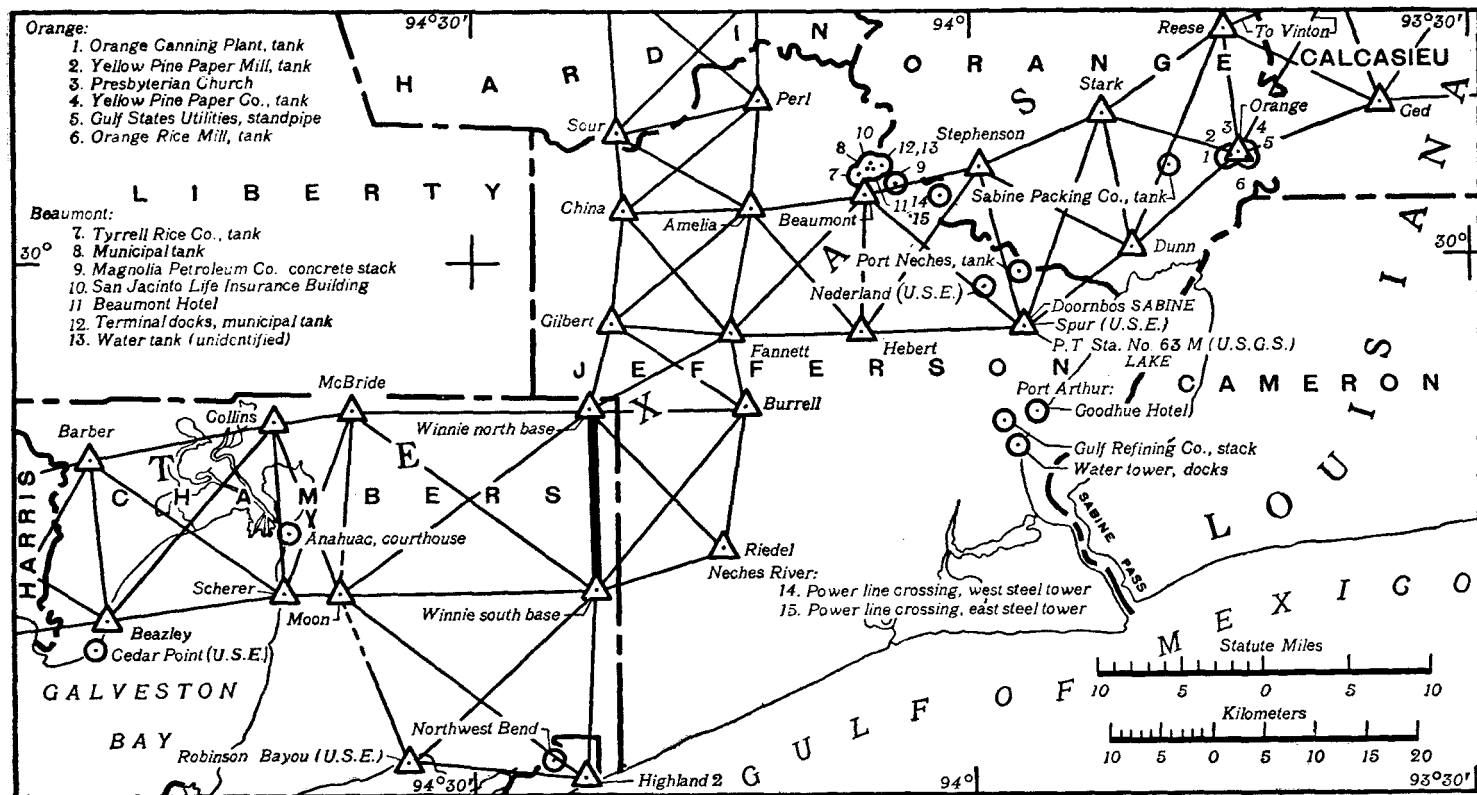


FIGURE 48.—Triangulation along the Gulf Coast arc, junction with the ninety-fourth meridian arc.

Index to positions, descriptions, elevations, and sketches

Station	Position	Description	Elevation	Sketch
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Asylum stack.....	48		347	14
Courthouse dome, Taylor County.....	48		347	14
Low standpipe.....	48		347	14
Standpipe (U.S.G.S.).....	47	203	347	14
Abrams.....	108	282	344	15, 36
Ackerly, small black tank, finial.....	116			36
Ackley.....	105	273	344	35
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Aero, 1931 (aerial beacon, Fort Crockett).....	148	337		47
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Highest windmill.....	31		345	7
Schoolhouse, cupola.....	31		345	7
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Ale.....	58	213	213	21
Alice.....	25	177	177	11
Alice:				
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Plaza Hotel elevator penthouse, center of sign.....	142			45
Port Compress Co., tank.....	142			45
Port, tank.....	143			45
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Corvett:				
Church.....	122			39
German Church.....	122			39
Smokestack.....	122		349	39
Cotton-compress building, top, Seguin.....	35		345	10
Cotton gin:				
Carlton, stack.....	32		345	7, 8
Johnsville, stack.....	31		345	7
Kyle, tank.....	33			9
Marion, Schultz & Dreyer's, stack.....	34		345	10
Olin, stack.....	32		345	7, 8
Purves, stack.....	32		345	7
Raymondville, smokestack.....	39		346	12
Roscoe, stack.....	49		347	14
County boundary monument.....	146	336		46
Courthouse:				
Abilene, Taylor County, dome.....	48		347	14
Anahuac, Chambers County, dome.....	151			48
Baird, Callahan County, dome.....	47		347	13
Barstow, Ward County, cupola.....	50		347	16
Brazoria, Brazoria County, old, steeple.....	147			46, 47
Canyon, Randall County, cupola, flagstaff.....	112			32
Claude, Armstrong County.....	95	259	348	31
Eastland, Eastland County.....	47		347	13
Edinburg, Hidalgo County, cupola.....	66		347	20
El Paso, El Paso County, dome, center.....	53			19
Groesbeck, Limestone County, finial.....	126		349	39, 40
Henrietta, Clay County, dome.....	29		345	6
Hondo, Medina County, tower.....	79			26
Jacksboro, Jack County, statue.....	30		345	6
Karnes City, Karnes County, steeple.....	35		345	10
Kountze, Hardin County, spire.....	135			44
Lampasas, Lampasas County, dome.....	32		345	8
Midland, Midland County, cupola.....	49		347	15
New Braunfels, Comal County, tower.....	34		345	9, 10
Odesa, Ector County, cupola.....	49		347	15, 16
Palestine, Anderson County, statue.....	127			40
Pecos, Reeves County, cupola.....	50		347	16, 17
Quanah, Hardeman County, cupola.....	85	242	348	29
Riogrande, Starr County, dome.....	68		347	21
Rockport, Aransas County, spire.....	144			45
Seguin, Guadalupe County, spire.....	34		345	10
Stanton, Martin County, dome.....	117			15, 37
Stephenville, Erath County, tower, center.....	31		345	7, 13
Tulia, Swisher County, cupola, finial.....	113			35
Vega, Oldham County.....	96		348	32
Covington	122	298	298	41, 43
Cowgill	40	187	187	20
Cowgill, water tank.....	41		346	20
Cox (U. S. G. S.).....	110	286	344	37
Crane.....	77	233	233	26
Crane (U. S. G. S.).....	79	236		26
Crawford 2.....	27	180		12
Crockett (Cherokee County).....	121	296	296	40, 41
Crockett (Crockett County).....	110	288	344	38
Crosby.....	107	279	344	36
Cross.....	133	309		44
Cube.....	19	157	157	6
Cullinan.....	149	338		47
Cunningham (Okla.).....	81	239	239	28
Cup.....	60	217	217	22
Cup, windmill northeast of station.....	71			22
Curry.....	109	283	344	15, 37
Curtis.....	44	196	196	16
Cushing.....	121	297	298	41
Cuthbert.....	43	193	193	14, 15
Cycamore.....	77	234	234	27
Daly (Okla.)	89	248	248	30
Dan.....	59	215	215	21, 22
Danbury.....	139	323		47
Davenport.....	108	281	344	36
Davidson.....	61	220	220	23

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Davis (Jeff Davis County).....	50		347	18
Davis (Webb County).....	60	216	216	22
Davis (U.S.E.).....	140	327		47
Dawson, standpipe.....	125			39
Day (Okla.).....	82	241	241	29
Delmore ranch, low silo.....	123			39
Delmore ranch, tall white silo.....	123		349	39
Del Rio, standpipe, final.....	75			24, 27
Dentonio.....	61	218	218	22
Dentonio:				
Hotel, south gable.....	71		347	22
Windmill.....	72			22
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Boggy Prairie.....	127		349	40
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Hamilton.....	122			8, 39
Logansport, south of (La.).....	128			41, 43
No. 1 (Starr County).....	69			21
No. 2 (Starr County).....	69			21
Or well, near Lakeview.....	124			39
Or well, Penelope.....	125			39
Well, Kenedy ranch.....	38	346		12
Devine.....	55	206	207	17
Devol, city water tank (Okla.).....	84	242	348	28
Diablo.....	46	199	200	18, 19
Diablo (U.S.G.S.) cairn.....	51	204		18, 19
Diaz (Maximo) ranch, windmill.....	67			20
Dickinson.....	139	325		47
Dickinson, Ice & Fuel Co., tank.....	148			47
Dixie.....	63	222	222	23, 27
Dobbins.....	63	223	223	23, 24, 27
Dodson.....	86	243	244	29
Doggett.....	122	299	299	41, 43
Dolores.....	59	215	215	21, 22
Dolores, windmill northwest of station.....	69			22
Donna.....	28	184	184	20
Donna:				
Longitude station.....	40	186		20
Standpipe.....	40			20
Sugar mill, taller of 2 stacks.....	66			20
Doornbos.....	141	332		48
Douro.....	44	196	196	16
Dower.....	103	271	348	34
Dry.....	65	228	228	25
Dryden:				
East base.....	65	227	227	24
East base latitude and longitude station.....	75	230		24
Water tank.....	75			24
West base.....	65	226	227	24
Dublin.....	44	196	196	16
Dublin:				
Church, tall spire.....	31		345	7
High School, cupola.....	31		345	7
Oil mill, center.....	31		345	7
Standpipe.....	31		345	7
Windmill, 2 miles south of.....	49		347	16
Dune (Okla.).....	91	251	251	29, 30
Dunn (Martin County).....	44	195	195	15
Dunn (Orange County).....	141	332		48
Eagle (Hudspeth County).....	46	200	200	18
Eagle (Maverick County).....	62	220	220	23
Eagle Pass:				
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Convent, cupola.....	73			23
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Water & Power Co., tall stack.....	73			23
East (Culberson County).....	50	203		18
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East base 1 (El Paso).....	54			19
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East base:				
Alice.....	26	177	177	11
Dryden.....	65	227		24
Seguin.....	23	169	169	9, 10
East Freeport, Stafford Chemical Co., tank.....	147			46, 47
Eastland:				
Courthouse, Eastland County.....	47		347	13
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Edinburg:				
Courthouse cupola, Hidalgo County	66		347	20
Pump Co., taller of 2 stacks	67			20
Second lift pump, stack	67			20
Edna, tank	145			46
Eignus	139	325		47
Eklund (N. Mex.)	96	259	343	33
Eldorado (Okla.)	82	240	240	29
Eldorado, U.S. Gypsum Co., water tank (Okla.)	85	242	348	29
Eldridge	64	226	226	24
Electra, city water tank	84	242	348	28
Electric-light plant, Merkel, tall stack	48		347	14
Electric-light pole in plaza, El Paso	54			19
Electric light and power plant, Laredo:				
Brick stack	69		347	22
Standpipe	69			22
Elevator:				
Amarillo, Great West Mill & Elevator, light	95	259	348	32
Hardesty, grain, north gable (Okla.)	103			34
Hardesty, grain, southwest corner (Okla.)	103			34
Pharr, east of railroad, flagpole	66			20
South gable (Okla.)	102			33
Texhoma, Riffe's grain	102			33, 34
Umbarger	96		348	32
Wildorado, Lester Stone Co.'s, center	96		348	32
Elkins	44	194	195	15, 37
Elliff	25	176	176	11
Elliff's (Cyrus) house chimney, Banquete	36		346	11
Elliot	98	264	343	33
Ellis (Hardin County)	133	310		44
Ellis (Lipscomb County)	92	253	253	30
El Paso:				
A	52			19
Astronomical station no. 1	53	205		19
B	52			19
C	52			19
City hall	53			19
City hall, flagstaff	54			19
Courthouse dome, center, El Paso County	53			19
East	53			19
East base 1	54			19
East base 2	54			19
Electric-light pole in plaza	54			19
Federal building tower, center	52	205		19
Federal building flagstaff	52	205		19
Latitude station	53	205		19
Longitude station (1892)	53	205		19
Longitude station (1911)	53	205		19
Magnetic station	53	205		19
Meridian stake	54			19
Middle base	54			19
Mills	53	205		19
Nichols Copper Co., smokestack	54			19
North base	52			19
Pierson Hotel	54			19
Presbyterian Church	53	205		19
South base	52			19
Transit stake	53			19
Weather	53	205		19
West	53			19
West base 1	54			19
West base 2	53			19
Wheeler's latitude and longitude station (Fort Bliss)	54	205		19
Elroy	86	243	243	29
Eltoro	57	209	209	20
Eltoro ranch, windmill	68			20
English	61	219	219	22, 23
Enterprise	121	298	298	41
Epley	43	194	194	15
Epworth League Pavilion, flagpole, Corpus Christi	143			45
E. S. E. Lubbock	115	292		36
Eskota water tank	49		347	14
Esperson Building, dome, Houston	149			47
Espey's ranch, windmill	71			22
Estes	45	196	197	16
Estill	138	321		46
Evanito	58	212	213	21
Evans (U.S.G.S.)	32			7, 8, 39
Evart	43	193	193	15
Evert	94	257	257	32

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Farland.....	61	219	219	23
Farquhar's windmill.....	122			8, 39
Federal building tower, center, El Paso.....	52	205		19
Federal building flagstaff, El Paso.....	52	205		19
Feely.....	63	224	224	24
Felt (Okla.).....	97	261	343	33
Fence (U.S.G.S.).....	109	285	344	37
Feora.....	59	214	214	21
Fieldings.....	60	216	216	22
Fieldings:				
Windmill east of north of station.....	71			22
Windmill northeast of station.....	71			22
First National Bank building, flagstaff, Jacksonville.....	127		349	40, 41
Fiat.....	42	189	189	13
Fiat Cone, southeast Boracho.....	76		347	18
Fiat-roofed building, chimney (Mexico).....	72			23
Fiat Top (Lampasas County).....	22	163	164	8
Fiat Top (Reeves County).....	50		347	17, 18
Fiat Top (Okla.).....	90	250	250	30
Fleming.....	25	173	174	11
Floerke.....	136	314		45
Flores.....	58	212	212	21
Flores Ranch, windmill.....	67			20
Florida (N.Mex.).....	46	202	202	19
Flour.....	149	339		47
Fohn (U.S.G.S.).....	77	232	233	26
Follett.....	90	249	249	30
Follett:				
Municipal water tank.....	104			30
Railroad water tank.....	92			30
Ford (La.).....	131	306		41, 43
Fordyce.....	57	209	209	20
Foreman (Ark.).....	129	300		42
Forks (La.).....	131	306		43
Fort.....	59	215	215	22
Fort windmill south of station.....	69			22
Fort Bliss (Wheeler's latitude and longitude station).....	54	205		19
Fort Crockett, aerial beacon (Aero, 1931).....	148	337	345	47
Foster.....	106	277	344	35
Francitas.....	138	319		46
Franklin.....	21	163	163	8
Frederick (Okla.).....	81	239	239	28
Frederick, city water tank (Okla.).....	85	242	348	28
Freeport municipal tank.....	147			46, 47
Frisco Railroad shops (taller of 2 metal stacks, Kingsville).....	37		346	11
Fuller.....	89	246	246	29
Gabriel.....	22	164	165	8, 9
Gallagher (U.S.G.S.).....	77	231	232	26
Galvan.....	60	217	218	22
Galveston Water & Power Co., tallest stack.....	148			47
Gammill (Okla.).....	80	237	237	28
Garcena.....	57	211	211	21
Garcia.....	57	209	210	20, 21
Garden.....	109	283	344	37
Gatlin.....	20	161	161	7, 13
Gaylord (Tex.-Okla.).....	104	271	348	30, 34
Ged (La.).....	142	333		48
Gem.....	89	247	248	30
Geneva.....	131	307		41, 43
Genoa.....	139	325		47
George.....	59	215	215	22
George, windmill west of station.....	69			22
German Baptist Church.....	122			8, 39
German Catholic Church, steeple.....	37			12
Gibson.....	21	162	162	7, 8
Gilbert (Parker County).....	20	160	160	7
Gilbert (Jefferson County).....	141	330		48
Gilmore.....	21	163	163	8
Gin stack:				
Alice, Walters & Co.'s.....	37		346	11
Clareville.....	36		346	11
Hornbortel's, August.....	33		345	9, 10
Johnsville.....	31		345	7
Marion, Schultz & Dreyer's.....	34		345	10
Mathis.....	36		346	11

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Oglesby, Farmers Union	123			39
Oglesby, Industrial Cotton Oil Co.	123			39
Parkman's	37		346	11
Gin tank, north of station Cardwell	144			45
Glass	61	219	219	23
Gleason	21	162	162	7, 8, 39
Glen Rio (Tex.-N. Mex.)	95	258	258	32
Glenrio, water tank	96		348	32
Goat Mountain, northwest end	76		347	25
Gomez Peak	50		347	17, 18
Goodhue Hotel, tower, Port Arthur	151			48
Goodwell, municipal water tank (Okla.)	103			34
Goose Creek, municipal tank	150			47
Gorgora	57	211	211	21
Gould (Okla.)	82	240	241	29
Gould, high school, north chimney (Okla.)	85	242		29
Grady (Okla.)	19	157	157	6
Grady:				
House east of station, north gable (Okla.)	29			6
Section corner near station (Okla.)	29			6
Graham (Hansford County)	99	265	343	34
Graham (Jasper County)	132	308		44
Grain	149	338		47
Grain elevator:				
Hardesty, north gable (Okla.)	103			34
Hardesty, southwest corner (Okla.)	103			34
South gable (Okla.)	102			33
Grande	57	210	210	21
Grandfield (Okla.)	81	238	238	28
Grandfield:				
City high school (Okla.)	84	242	348	28
City water tank (Okla.)	84	242	348	28
Great West Mill & Elevator, light, Amarillo	95	259	348	32
Green	81	240	240	29
Green roof, north gable, Urebeno	69			21
Greenwood (La.)	130	304		42, 43
Gregory	132	308		44
Gregory, Catholic church steeple	143			45
Griggs (Okla.)	98	263	343	33
Grigsby	133	311		44
Groesbeck:				
Courthouse, final, Limestone County	126		349	39, 40
Standpipe	126		349	39, 40
Gulf Building flagpole, Houston	149			47
Gulf, municipal tank	146			46
Gulf Sulphur Works, black tank	146			46
Gus	23	167	168	9
Guymon, black municipal standpipe, center	103			34
Hackberry	77	233	233	26
Hackberry (U.S.G.S.)	79	236		26
Hale	43	191	191	14
Hale Center, municipal water tank	113			35
Hale County, southeast corner	113	292	349	35
Hale County, southeast corner eccentric	114			35
Hallinan	137	316		45
Hamilton	63	223	223	23, 24, 27
Hamilton, oil derrick	122			8, 39
Handy	56	208	208	20
Hanna (Okla.)	89	247	247	30
Hansford County, northeast corner	103	271	348	34
Happy, municipal water tank, final	112			35
Hardeman	85	242	242	29
Hardesty, grain elevator, north gable (Okla.)	103			34
Hardesty, grain elevator, southwest corner (Okla.)	103			34
Hardy	98	264	343	33, 34
Harlingen	28	184	184	20
Harlingen:				
Pumping station, tall brick stack	39		346	20
Standpipe	39		346	20
Sugar mill, latticed steel derrick	39		346	20
Harmer	97	261	343	33
Harris	45	196	196	16
Harrison (Val Verde County)	64	224	224	24
Harrison (Wilbarger County)	81	239	239	28
Harrold	81	239	239	28
Hartman (Okla.)	92	253	253	30
Hartwell	94	258	258	32
Haslam, standpipe	128			41, 43
Hastings (Okla.)	80	236	236	6, 28

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City water tank (Okla.)	83	241	348	6, 28
High school cupola (Okla.)	83		348	6, 42
Hawkins (Ark.)	120	300		16
Hays	45	197	197	13
Hearn	42	189	189	35
Heath	105	275	344	48
Hebert	141	331		21
Hebron	57	210	210	20
Heidelberg, church steeple	39		346	43
Hemphill, water tank	135			24
Hen	64	226	226	38
Henderson	111	290	344	
Henrietta:				
Courthouse, dome, Clay County	29		345	6
House, 5 miles southeast of, southeast gable	29		345	6
Schoolhouse	29		345	6
Standpipe	29		345	11
Henrietta M. King School, cupola, Kingsville	37		346	29
Henry (Okla.)	82	241	241	29
Herg	85	242	242	29
Hermanas (N. Mex.)	46	202	202	19
Herndon	24	170	170	10
Herndon Hill (U.S.G.S.)	35	186		10
Hess (Okla.)	81	239	240	28
Hewitt, steel smokestack	123			39
Hext	89	247	247	30
Hickerson (Okla.)	81	239	239	28
Hickley	56	208	208	20
Hidalgo	28	183	183	12, 20
Hidalgo, church steeple near river	67		347	20
Higgins astronomical station	91	252	252	30
Higgins water tank	92			30
High or Sawtooth Mountain	50		347	18
High school:				
Dublin, cupola	31		345	7
Gould, north chimney (Okla.)	85	242	348	29
Grandfield (Okla.)	84	242	348	28
Hastings, cupola (Okla.)	83		348	6, 28
Louis, cupola (Okla.)	85	242	348	29
Lubbock, tip of dome	117			36
Mexia, dome	126			39, 40
Palacios, cupola	146			46
Petrolia, cupola	83	241	348	6, 28
Port Lavaca, cupola	145			46
Ryan, cupola (Okla.)	82		348	6
Teague, dome with flagstaff	127			40
Highest peak, Anacacho Mountains	74			23, 27
Highland 2	151	340		48
Hillcrest	77	231	231	26
Hillen	107	278	344	36
Hillister	133	309		44
Hillister eccentric	132	309		44
Hitch	103	271	348	34
Hitchland north	103	270	348	34
Hitchland south	103	270	348	34
Hitchland, R. R. water tank, finial (Tex.-Okla.)	103			34
Hitson (U.S.G.S.)	42	189	189	13
Hoddy	64	226	226	24, 38
Hogland	99	266	343	34
Holland	129	300		42
Hollis (Okla.)	82	241	241	29
Hollis, city water tank (Okla.)	85	242	348	29
Holmes	106	276	344	35
Holt (Lubbock County)	106	277	344	35, 36
Holt (Nacogdoches County)	121	298	298	41
Hondo	78	235	235	26
Hondo, courthouse tower, Medina County	79			26
Hondo water tank	79			26
Honey Island, tall stack	135			44
Honey Island, water tank	135			44
Hooks	129	301		42
Hoover	111	290	344	38
Hoover (N. Mex.)	96	260	260	33
Horn	119	294	294	39, 40
Hornbortel's (August) gin, stack	83		345	9, 10
Hoskins	139	323		47
Hoskins Mound:				
Freeport Sulphur Co., east tank	147			47
Freeport Sulphur Co., stack	147			47
Freeport Sulphur Co., west tank	147			47
Hospital, Cottonville, spire, Texarkana (Ark.)	134			42

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Big Springs, Hotel Settles.....	117			15
Bowie, National Hotel, cupola.....	30		345	6
Corpus Christi, Plaza Hotel, elevator penthouse, center of sign.....	142			45
Dentonio, south gable.....	71		347	22
El Paso, Hotel Pierson.....	54			19
Lubbock, silver tank, finial.....	114			36
Midland, sign.....	117			15
Port Arthur, Goodhue Hotel, tower.....	151			48
Waco, Raleigh, flagstaff.....	124			39
House:				
Ballou.....	144	334		45
Banquete, Elliff's (Cyrus), chimney.....	36		346	11
Bellevue, Webb's, cupola.....	29		345	6
Brackettville, cupola.....	74			23, 27
Dr. Spohn's Corpus Christi, cupola.....	143			45
Eagle Pass, 12 miles northwest of, cupola.....	73			
East of station Grady, north gable.....	29			6
Henrietta, 5 miles southeast of, southeast gable.....	29		345	6
Jones' (Captain), tallest cone.....	35		345	11
Jones, northwest of station, center chimney.....	30			6
King's ranch, tallest chimney.....	36		346	11
Long, north center chimney.....	31		345	7, 13
Mine, small.....	71			22
Norias', south gable.....	38		346	12
On ridge, north chimney.....	29		345	6
Paloma, 3 miles northwest of, north gable.....	73			23
Small, mine.....	71			22
Taylor, north of station, south gable.....	69			22
Tordillo, white, west gable.....	71		347	22
Twin, northwest of station, south gable.....	71			22
Weatherford, white, with red roof, cupola.....	31		345	7
Weatherford, yellow, with dark roof, cupola.....	31		345	6
Webb's, Bellevue, cupola.....	29		345	
White (Mexico).....	70			22
Wood's ranch, cupola.....	36		346	11
Young's (J. B.), north chimney.....	30			6
Houston:				
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Jail, Jacksboro, cupola	30		345	6
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Jamerson ranch, windmill	74			23
Japson (U. S. G. S.)	109	286	344	37
Jarilla (N. Mex.)	46	201	201	19
Jarilla latitude and longitude station (N. Mex.)	54	206		19
Jerico	93	255	255	31
Jim	63	224	224	24
Jim, cairn	75	230		24
Jim Ned (U. S. G. S.)	30	185		6
J. M. West Estate, tank	148			47
Johnson (San Patricio County)	136	313		11, 45
Johnson (Ward County)	45	197	197	16
Johnsville, cotton gin stack	31		345	7
Johnstone	63	223	223	23, 24, 27
Johnstone latitude and longitude station	74	230		23, 24, 27
Johnstone, windmill northeast of station	74			23, 24, 27
Johnstone, windmill south of station	75			23, 24, 27
Jones (Brazoria County)	139	322		46, 47
Jones (Clay County)	19	158	158	6
Jones' (Captain) house, tallest cone	35		345	11
Jones, house northwest of station, center chimney	30			6
Joplin, old chimney northwest of	30		345	6
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Jurnegan (N. Mex.)	55	206	206	17
Kaleta	136	312		11
Kanz	109	284	344	37
Karnes	24	172	172	10
Karnes latitude station	35	186		10
Karnes City, courthouse steeple, Karnes County	35		345	10
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Kelln (Okla.)	91	252	252	30
Kelly	63	223	224	24, 27
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Kennedy (Uvalde County)	77	233	233	26
Kenner	146	336		46
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Kerrick	97	263	343	33
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Henrietta M. King School, cupola	37		346	11
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Presbyterian Church, steeple	37		346	11
Standpipe	37		346	11
Kirschman	100	268	343	30, 34
Kirvin	120	295	295	40
Kleberg	37	186	186	11, 12
Kleberg eccentric	26	178		11, 12
Klein	105	273	344	35
Knob	60	216	216	22
Knob, windmill northeast of station	71			22
Knox Refining Co., tank, Texas City	148			47
Kountze	133	310		44
Kountze, courthouse spire, Hardin County	135			44
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Donna.....	40	186		20
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Massie.....	111	289	344	38
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Mathis:				
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Mercedes:				
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Santa Rosa Mountain	75		347	24
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Stack, tallest of 3, mine	73			23
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Mid	50			18
Middle base (El Paso)	54			19
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Courthouse cupola, Midland County	49		347	15
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Landing field, airway beacon no. 24	118			15, 16
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53 eccentric (Tex.-N. Mex.)	55	207	207	17
61 (Tex.-N. Mex.)	56	208		17
61 eccentric (Tex.-N. Mex.)	55	207	207	17
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Milepost:				
No. 1 (N. Mex.-Tex.)	101	269		33
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Miller (Bexar County)	76	230	231	10, 26
Miller (Okla.)	80	238	238	28
Miller latitude station	36	186		11
Miller (U. S. G. S.)	78	235		10, 26
Milling & Power Co.'s tank, Seguin	35		345	10
Mills (El Paso)	53	205		19
Mills (Val Verde County)	111	291	344	24, 38
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Mine spire (Mexico)	72			23
Mine stack (Mexico)	72			23
Mine, tallest of 3 stacks (Mexico)	73			23
Mission (Hidalgo County)	56	209	209	20
Mission eccentric	76	231		9, 10
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Mitchell	111	291	344	38
Mitchusson (Okla.)	99	266	343	34
Mitla	28	184	184	20
Mofeta section house, south gable	75			24
Moleno	59	214	214	21
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Monastery, north end, east cupola	67		347	20
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Monument (Starr County)	57	210	210	21
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Moody, schoolhouse cupola	123			39
Moody, water tank	123		349	39
Moon	140	328		48
Mooney (Okla.)	97	262	343	33
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Moore (Jack County)	20	159	159	6
Moore (Val Verde County)	63	223	223	23, 24, 27
Moore, windmill near station	75			23, 24, 27
Moore, windmill north of station	75			23, 24, 27
Moras	78	235	235	23, 27
Moreland	90	249	249	30
Morgans Peak	49		347	14, 15
Morgan Point (U. S. E.)	150	339		47
Morgan Point 2	140	326		47
Morris (Ector County)	44	195	195	15
Morris (Ochiltree County)	100	267	343	34
Morrison	42	190	190	14
Morrison, church 6 miles west of, belfry	48		347	14
Mosley	108	282	344	36

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Mountain peak no. 3 (Mexico).....	68			21
Mountain peak no. 4 (Mexico).....	68			21
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Mungers tank, Mexia.....	126		349	39, 40
Mushaway (Muchakooago) Peak.....	49		347	36
Mushaway (Muchakooago) Peak, south side, white outcrop.....	116			36
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Myers (Coryell County).....	119	293	293	8, 39
Myra (La.).....	130	303		42
Nation.....	65	228	228	25
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Nine, windmill south of station.....	73			23
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Schoolhouse, cupola.....	29		345	6
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Nolan.....	25	176	176	11
Norlas.....	27	181	181	12
Norlas' house, south gable.....	38		346	12
Norlas' house, windmill $\frac{1}{4}$ mile north-northeast of.....	38		346	12
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Jacksonville.....	121	297	297	40, 41
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Shreveport.....	131	305		43
Stanton.....	44	194	194	15, 37
Stephenville.....	21	162	162	7
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Winnie.....	140	329		48
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North Franklin.....	48	201	201	19
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Bowie, latitude station.....	30	165		6
Northwest Bend.....	151	340		48
Northwest corner of Texas, Clarks monument (N. Mex.-Tex.).....	101	269		33
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Oglesby:				
Farmers Union, gin stack.....	123			39
Industrial Cotton Oil Co., gin stack.....	123			39
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Snyder	55	207	207	17
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Skidmore, Catholic Church.....	36		346	11
Skidmore, Methodist Church.....	36		346	11
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Stephenville, oil mill.....	31		345	7, 13
Texarkana, Southwest Gas & Electric Co., concrete.....	134			42
Village Mills, Kirby Lumber Co., third from east of 7.....	135			44
Waco power plant, tall brick.....	124			39
Wichita Falls, City Power and Electric Co.....	83	241	348	28
<i>Standpipe:</i>				
Abilene, low.....	48		347	14
Abilene (U.S.G.S.).....	47	203	347	14
Alice, center.....	37		346	11
Austin, Colored Asylum.....	33		345	9
Bishop.....	37		346	11
Bowie (U.S.G.S.).....	30		345	6
Brackettville.....	74		347	23, 27
Central Laredo waterworks.....	70		347	22
Channel City.....	150			47
Cisco.....	47		347	13
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Donna.....	40			20
Dublin.....	31		345	7
Groesbeck.....	126		349	39, 40
Guymon, black municipal, center.....	103			34
Harlingen.....	39		346	20
Haslam.....	128			41, 43
Henrietta.....	29		345	6
Hubbard.....	125		349	39
Kingsville.....	37		346	11
Lakeview.....	124			39
Laredo, electric light and power plant.....	69		347	22
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McAllen.....	66			20
Mercedes.....	39		346	20
Mexia.....	126		349	39, 40
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New Braunfels.....	34		345	9, 10
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Stark.....	141	332		48
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Steins church, spire.....	35		345	10
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Oil mill, stack.....	31		345	7, 13
South base.....	21	162	162	7
Tarleton College, dome, center.....	31		345	7, 13
Stewart.....	106	276	344	35
Stillman.....	27	181	181	12
Stockdale.....	24	171	171	10
Stonewall (La.).....	131	305		43
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Donna, taller of 2 stacks.....	66			20
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San Benito, tall brick stack.....	41		346	20
Sullivan.....	80	238	238	28
Sullivan (U.S.G.S.).....	84	242	242	28
Sunshine.....	81	238	238	28
Sunshine (U.S.G.S.).....	84	242	242	28
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Do.....	119			38
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Swearingen.....	132	309		44
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Ackerly, small black, final.....	116			36
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Amarillo, Price Memorial College.....	112			32
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Aransas Pass, old municipal.....	144			45
Aransas Pass Warehouse & Terminal Co.....	144			45
Arristrong, railroad water.....	38		346	12
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Austwell, municipal.....	145			45
Bay City, municipal.....	146			46
Baytown, water, silver.....	150			47
Beaumont terminal docks, municipal.....	151			48
Beaumont, Tyrrell Rice Co.....	151			48
Beaumont, unidentified.....	135			48
Best, municipal.....	118			37
Big Lake, municipal.....	118			37
Boise City, Cimarron Utilities Co.....	102			33
Booker, municipal.....	104			34
Booster Station, black, final.....	101			33
Booster Station, galvanized on red platform, center.....	101			33
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Canyon, West Texas State Normal School, final.....	112			32
Cardwell, gin tank north of.....	144			45
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Clayton, municipal water (silver), final.....	101			33
Corpus Christi, Aransas Compress Co.....	143			45
Corpus Christi, Port.....	143			45
Corpus Christi, Port, Compress Co.....	142			45
Dickinson Ice & Fuel Co.....	148			47
East Freeport, Stafford Chemical Co.....	147			46, 47
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Goodwell, municipal.....	103			34
Goose Creek, municipal.....	150			47
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Hitchland, R. R., final (Tex.-Okla.).....	103			34
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Hoskins Mound, Freeport Sulphur Co., west.....	147			47
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Kyle cotton gin.....	33			9
Lamar Catholic Church.....	144			45
Lamar Mine.....	73			23
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League City, powerhouse	148			47
Lorenzo, municipal, final	114			35
Lubbock, Hotel Lubbock, silver water, final	114			36
Lubbock, West Texas Institute of Technology, final	114			36
McGregor, in group of stacks	123			39
Mexia, Mungers	126		349	39, 40
Midland, municipal	117			15
Near red-roofed building	74			23
Near station Laplace	73			23
North Lubbock, municipal, final	115			36
North Plainview, silver, junction with feed pipe	113			35
O'Donnell, municipal	116			36
Orange, Orange Canning Plant	152			48
Orange, Orange Rice Mill Co.	152			48
Orange, Sabine Packing Co.	152			48
Orange, Yellow Pine Paper Co.	152			48
Palacios, municipal	146			46
Palestine, flat-topped	127			40
Pearland, black	149			47
Pelly, municipal	150			47
Perryton, black	104			34
Perryton, municipal (silver), final	104			34
Petersburg, railroad, final	113			35
Plainview, cotton mill, final	113			35
Plainview, municipal, final	113			35
Port Lavaca, municipal	145			46
Port Neches, black	151			48
Refugio, tall silver	143			45
Rockport First National Bank Building	144			45
Seguin, light-colored, round, east of	34		345	10
Seguin, Milling & Power Co.	35		345	10
Shell pumping station, black (Glasscock County)	118			37
Shell pumping station, black (Reagan County)	118			37
Shoreacres, black	149			47
Slaton, cotton compress, silver	115			36
Slaton, municipal, final	115			36
Southeast Lubbock, municipal	115			36
Stanton, municipal, final	117			15, 37
Stratford, West Texas Utilities Co., final	102			33
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Tehuacana, small white wooden	127			39, 40
Texas City, Knox Refining Co.	148			47
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Texline, West Texas Utilities Co., final	101			33
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Timpson	128		349	41
Tivoli Gin Co.	145			45
Tuco, West Texas Utilities Co.	113			35
Tulia, municipal	113			35
Waco, steel, white top	124			39
Wadsworth, Rougley Gin Co.	146			46
Weatherford, near white house	31		345	7
West (J. M.) Estate	148			47
West, on top of brick cotton mill	125			39
Tarida	27	182		12
Tarleton College, dome center, Stephenville	31		345	7, 13
Taylor	59	215	215	22
Taylor, house north of station, south gable	69			22
Teague	120	295	295	40
Teague:				
High-school dome with flagstaff	127			40
Low water tank at railroad shops	127			40
Tall water tank	127			40
Tehuacana	120	294	294	39, 40
Tehuacana latitude and longitude station	125	300		39, 40
Tehuacana:				
Small, white wooden tank	127			39, 40
Westminster College	127			39, 40
Temple City, water tank (Okla.)	83	241		6, 28
Tenacitas (Mexico)	28	184	185	20
Tenaha, white church spire	128			41, 43
Terry reference mark	145	334		45
Teston	106	275	344	35
Texarkana:				
Airplane beacon	134			42
Cottonville Hospital spire (Ark.)	134			42
Post office, square brick tower	134			42
Southwest Gas & Electric Co., concrete stack	134			42
Texas & Pacific R. R. water tank	134			42
Water tank southwest of, flat top	134			42

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T. 1 N., R. 4 E., sec. 36, southeast corner (Tex.-Okla.)	102	269	348	33
T. 4 S., R. 7 W., sec. 2, northeast corner (Okla.)	29			6
T. 5 S., R. 7 W., sec. 24, southwest corner (see T. 5 S., R. 7 W., sec. 25, center) (Okla.)				6
T. 5 S., R. 7 W., sec. 25, center (Okla.)	29	185		
Texas-New Mexico boundary:				
Clark monument no. 9	95	258		32
Mile corner no. 53	56	207		17
Mile corner no. 53 eccentric	55	207	207	17
Mile corner no. 61	56	208		17
Mile corner no. 61 eccentric	55	207	207	17
Mile corner no. 306	101			33
Milepost no. 1	101	269		33
Milepost no. 4	101			33
Texas, northeast corner of (1928)	104	272	348	30
Texas, northwest corner of, Clarks monument	101	269		33
Texas, old northeast corner of	92	253		30
Texas-Oklahoma boundary:				
Clark monument no. 5	102	270	348	33
Clark monument no. 7	102	270		33
Clark monument no. 9	103	271		34
Clark monument no. 10	103	271	348	34
North rangeline 15/14 (Okla.)	87	244	245	28
North rangeline 17/16 (Okla.)	88	246	246	28
North rangeline 12/13, secs. 25/30 (Okla.)	86			28
Reference mark no. 2	86	244	244	28
Reference mark no. 4	87	244	244	28
Reference mark no. 7	87	244	244	28
Reference mark no. 12	87	244	244	28
Reference mark no. 15	87	245	245	28
Reference mark no. 16	87	245	245	28
Reference mark no. 18	88	245	245	28
Reference mark no. 21	88	245	245	28
Sec. 6, witness corner (Okla.)	88	245	245	28
Sec. 10, witness corner (Okla.)	87	245	245	28
Sec. 14, witness point (Okla.)	87	244	244	28
Sec. 29, witness point (Okla.)	88	245	245	28
Secs. 34/35, quarter corner (Okla.)	87	244		28
Sec. 35, witness point (Okla.)	88	245	245	28
Texas-Oklahoma boundary mark (1921)	88	246	246	29
Texas-Oklahoma old boundary and T. 1 N., R. 27 W., secs. 2/11, corner	88	246		29
Texas-Oklahoma old boundary and Tps. 2/3 N., R. 27 W., secs. 2/35, corner	88	246		29
Texhoma:				
Cimarron Utilities Co., water tank, final (Okla.)	102			33, 34
Riffe's grain elevator	102			33, 34
Texhomex (Tex.-Okla.-N. Mex.)	101	269	348	33
Texline, West Texas Utilities Co., water tank, final	101			33
Texola (Okla.)	91	250	251	29
Texola, water tank (Okla.)	92			29
Texon, municipal water tank	118			37
Thomas (Guadalupe County)	24	170	170	10
Thomas (Lynn County)	107	278	344	36
Thomas (Webb County)	60	217	217	22
Thornberry	80	237	237	6, 28
Tleken	23	168	168	9, 10
Timpson	121	298	298	
Timpson:				
Church	128		349	41
Tank	128		349	41
Timson (see Timpson)				41
Tippetts	64	224	225	24, 38
Tipton (Okla.)	81	238	238	28
Tivoli:				
Lutheran Church, spire	145			45
Tivoli Gin Co., tank	145			45
Todd	110	288	344	38
Tom	61	218	218	22
Top	43	193	193	15
Tordillo	60	216	217	22
Tordillo, white house, west gable	71		347	22
Town	132	308		44
Towne	63	222	222	23
Toyah	45	198	198	17, 18
Transit stake (El Paso)	53			19
Transmission tower, northeast, Baytown	150			47
Transmission tower, southwest, Baytown	150			47
Traverse station no. 9 (U.S.G.S.), B.M.	38			12
Traverse station no. 63 M (U.S.G.S.), primary	152	341		48

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Trent:				
Christian Church, spire	48		347	14
Schoolhouse, belfry	48		347	14
Tres Hermanos	75			25
Tres Hermanos (cairn)	75			25
Trimmins	93	254	254	20, 31
Tuco, West Texas Utilities Co., tank	113			35
Tulia	105	274	344	35
Tulia:				
Courthouse, finial, Swisher County	113			35
Municipal water tank	113			35
Turcotte	27	180	180	12
Turcotte, section house, north (largest) chimney	38		346	12
Twin	61	218	218	22
Twin Buttes (U.S.G.S.)	75			24
Twin, house northwest of station	71			22
Tye:				
Baptist Church, spire	48		347	14
Church north of, belfry	48		347	14
Methodist Church, spire	48		347	14
Tyson (La.)	130	303		42
Umbarger	94	257	257	32
Umbarger, elevator	96		348	32
Union	59	214	215	21
United States and Mexico boundary monument:				
No. 1	53	205		19
No. 2	52	205	205	19
No. 2 eccentric	51	204		19
No. 3	51	204	204	19
R. P. no. 4	68	229	229	21
R. P. no. 17 (station Banco)	67	229	229	20
R. P. no. 28	40	187	187	20
R. P. no. 31	40	186	187	20
University	111	289	344	38
University of Texas:				
Land corner 27	119			38
Survey station	118			38
Survey station	119			38
Urebeno	59	214	214	21
Urebeno, green roof, north gable	69			21
U.S. Geological Survey:				
B. M. F 9	142			11, 45
B. M. and traverse station no. 9	38			12
Primary traverse station no. 63 M	152	341		48
U.S. Gypsum Co., water tank, Eldorado (Okla.)	85	242	348	29
Vega, Courthouse, Oldham County	96		348	32
Vega north base	94		257	32
Vega south base	94		257	32
Vernon, city water tank	84	242	348	28
Village Mills, Kirby Lumber Co., third stack from east of 7	135			44
Village Mills north	133	309		44
Village Mills south	133	309		44
Vinson (Kenedy County)	27	181	181	12
Vinson (Okla.)	93	254	254	29
Vinton (La.)	141	333		48
Vivian (La.)	130	303		42
Vivian, water tank (La.)	135			42
Waco:				
Amicable Building, elevator shaft, center	124			39
Amicable Building, flagpole	124			39
Camp MacArthur, tall steel tank near	124			39
Camp MacArthur, tall wooden tank near	123			39
Power plant, tall brick stack	124			39
Raleigh Hotel, flagstaff	124			39
Steel tank, white top	124			39
Wadsworth, Rougley Gin Co., tank	145			46
Wall (Okla.)	99	266	343	34
Walters, city water tank (Okla.)	83	241	348	28
Walters & Co., gin stack, Alice	37		346	11
Warmuth	95	258	258	31, 32
Washburn	94	256	256	32
Washita (Okla.)	91	251	252	30
Wasp (U.S.G.S.)	49	203	203	14
Wasson	108	281	344	36
Water & Power Co., tall stack, Eagle Pass	73			23

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Altus (Okla.).....	85	242	348	29
Amarillo.....	95	259	348	32
Amarillo Country Club, final.....	112			32
Amarillo municipal, final (near Seventh and Bonham Streets).....	112			32
Amarillo, Price Memorial College.....	112			32
Angleton, municipal.....	147			47
Armstrong, railroad.....	38		346	12
Ashdown, city (Ark.).....	134			42
Aviation field, Call, Wichita Falls.....	83	242	348	28
Baytown, silver.....	150			47
Beaumont, municipal.....	135			48
Beaumont, terminal docks, municipal.....	151			48
Beaumont, Tyrrell Rice Co.....	151			48
Beaumont (unidentified).....	135			48
Best, municipal.....	118			37
Big Lake, municipal.....	118			37
Boise City, Cimarron Utilities Co.....	102			33
Booker, municipal.....	104			34
Burkburnett.....	84	242	348	28
Bushland.....	96		348	32
Byers.....	83	241	348	6, 28
Canyon, West Texas State Normal School, final.....	112			32
Chattanooga (Okla.).....	84	242	348	28
Clarkwood, municipal.....	142			11
Clayton, municipal (silver), final.....	101			33
Cowgill.....	41		346	20
Devol (Okla.).....	84	242	348	28
Dryden.....	75			24
Eldorado, U.S. Gypsum Co. (Okla.).....	85	242	348	29
Electra.....	84	242	348	28
Eskota.....	49		347	14
Follett, municipal.....	104			30
Follett, railroad.....	92			30
Frederick (Okla.).....	85	242	348	28
Glenrio.....	96		348	32
Goodwell, municipal.....	103			34
Goose Creek, municipal.....	150			47
Grandfield (Okla.).....	84	242	348	28
Hale Center, municipal.....	113			35
Happy, municipal.....	112			35
Hastings City (Okla.).....	83	241	348	6, 28
Hemphill.....	135			43
Higgins.....	92			30
Hitchland R.R., final (Tex.-Okla.).....	103			34
Hollis (Okla.).....	85	242	348	29
Hondo.....	79			26
Honey Island.....	135			44
Idalou, municipal, final.....	114			35, 36
Illinois Central R.R. (1 mile east of White Pine Hospital) (La.).....	135			42, 43
Iowa Park.....	83	241	348	28
Jacksonville, city.....	128			40, 41
Kenedy ranch.....	38			12
Lamesa, municipal, final.....	116			36
Lark.....	95	259		31
Lorenzo, municipal, final.....	114			35
Lubbock, Hotel Lubbock, silver, final.....	114			36
Lubbock, West Texas Institute of Technology, final.....	114			36
Mart.....	125			39
McGregor, near old artesian wells.....	123			39
Merkel, tall.....	48		347	14
Mexia, Mungers.....	128		349	39, 40
Mexia, Mungers.....	117			15
Midland, municipal.....	123		349	39
Moody.....	134			42
New Boston.....	134			19
Newman, railroad (N. Mex.).....	54			36
North Lubbock, municipal, final.....	115			35
North Plainview, silver, junction with feed pipe.....	113			36
O'Donnell, municipal.....	116			42
Oil City (La.).....	85	242	348	20
Olustee (Okla.).....	146			46
Palacios, municipal.....	127			40
Palestine, flat-topped.....	104			34
Perryton, black.....	104			34
Perryton, municipal (silver), final.....	113			35
Petersburg, railroad, final.....	113			35
Plainview, cotton mill, final.....	113			35

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Plainview, municipal, final	113			35
Quanah	85	242	348	29
Raymondville	39		346	12
Raymondville, municipal	39			12
Robstown, railway	142			11
Robstown, municipal	142			11
Rudolph	38		346	12
Ryan, city (Okla.)	82	241	348	6
Sabinal, new	79			26
Sarita, municipal	38			12
Seguin, Milling & Power Co.	35		345	10
Shamrock	95	259		29, 31
Shattuck (Okla.)	92			30
Shell pumping station, black	118			37
Shell pumping station, black, final	118			37
Sinton, municipal	142			11
Slaton, cotton compress, silver	115			36
Slaton, municipal, final	115			36
Southeast Lubbock, municipal	115			36
Stanton, municipal, final	117			15, 37
Stratford, West Texas Utilities Co., final	102			33
Tahoka, municipal, final	116			36
Teague, railroad shops, low	127			40
Teague, tall	127			40
Texarkana, southwest, flat top	83	241		6, 28
Temple City (Okla.)	134			42
Texarkana, Texas & Pacific R.R.	124			42
Texhoma, Cimarron Utilities Co., final	102			33, 34
Texola (Okla.)	101			33
Texline, West Texas Utilities Co., final	92		348	29
Texon, municipal	118			37
Tuco, West Texas Utilities Co.	113			35
Tulia, municipal	113			35
Vernon	84	242	348	28
Vivian (La.)	135			42
Waco, tall steel tank, white top	124			39
Walters, city (Okla.)	83	241	348	28
Waurika, city (Okla.)	83	241	348	6
Wellington	95	259	348	29, 31
Wichita Falls, Call aviation field	83	242	348	28
Wichita Falls, State Hospital	83	242	348	28
Water tower:				
Beeville	36		346	11
Juarez (Mexico)	52			19
Seguin, oil factory	34		345	10
Watson	105	275	344	35
Waters Mountain (U.S.G.S.)	32	185	185	8
Waurika, city water tank (Okla.)	83	241	348	6
Weather (El Paso)	53	205		19
Weatherford:				
Tank near white house	31		345	7
White house with red roof, cupola	31		345	7
Yellow house with dark roof, cupola	31		345	7
Webb's house, Bellevue, cupola	29		345	6
Welch (N. Mex.)	55	206	206	17
Welder (Bee County)	25	175	175	11
Welder (Calhoun County)	137	317		45
Well (U.S.E.)	147	336		46, 47
Well Point	145	335		46
Well Point 2	145	335		46
Wellington, water tank	95	259	348	29, 31
Wesley	105	272	344	31, 32, 35
West (Culberson County)	50	203		18
West (El Paso County)	53			19
West (McLennan County)	119	294	294	39
West 2 (U.S.E.)	147	336		46, 47
West base 1 (El Paso)	54			19
West base 2 (El Paso)	53			19
West base:				
Alice	26	178	178	11
Dryden	65	226	227	24
Point Isabel	41	188	188	20
Seguin	23	169	169	9, 10
West (J. M.) Estate, tank	148			47
Westminster College, Tehuacana	127			39, 40
West:				
Standpipe	124			39
Tall red church spire	124			39
Tank on top of brick cotton mill	125			39
White church	124			39
West Texas Dairy Products Co., stack, Lamesa	116			36

Index to positions, descriptions, elevations, and sketches—Continued

Station	Position	Description	Elevation	Sketch
West Texas Institute of Technology, Lubbock:	<i>Page</i>	<i>Page</i>	<i>Page</i>	<i>Figure</i>
Administration building, east cupola	114			36
Administration building, west cupola	114			36
Water tank, finial	114			36
West Texas State Normal School, Canyon	96			32
West Texas State Normal School, Canyon, water tank, finial	112			32
Westbrook Methodist Church, spire	49		347	14, 15
Wheeler	89	246	246	29, 30
Wheeler's latitude and longitude station (Fort Bliss)	54	205		19
White	62	221	221	23
White church, red cone, spire, Beeville	35			11
White church spire, southeast of Chambliss	32		345	8
White house (Mexico)	70			22
White house, Tordillo, west gable	71		347	22
White house with red roof, cupola, Weatherford	31		345	7
White tip	75			25
White, windmill near station	73			23
White windmill southwest of station Orvil	70			22
Whitsett	94	257	257	32
Whittle	81	240	240	28, 29
Whorton (Okla.)	98	264	343	33, 34
Wichita Falls:				
Call aviation field, water tank	83	242	348	28
City Power and Electric Co., stack	83	241	348	28
State Hospital, water tank	83	242	348	28
Wies	25	173	173	10, 11
Wiff	62	221	221	23
Wildorado, Lester Stone Co.'s elevator, center	96		348	32
Willie	119	294	294	39
Wilkerson	120	295	296	40
Williams	43	193	194	15, 37
Willie	60	217	217	22
Willis (Okla.)	80	237	237	28
Wilson (Armstrong County)	93	255	255	31
Wilson (Calhoun-Victoria Counties)	137	318		45, 46
Wilson (Lubbock County), north of, church belfry, finial	115			36
Wilson (Lubbock County), southwest of, church belfry, finial	115			36
Windmill (Dimmit County)	72			22
Windmill (Kinney County)	74			23
Windmill (Maverick County)	72			23
Windmill:				
A	69			21
Agnes, highest	31		345	7
Arsia Ranch	71			22
Barr, near station	72			22, 23
Bellevue, Orton's	29		345	6
Bertram, railroad	33		345	8, 9
Big, near station	71			22
Bowdecker's, tower	29		345	6
Capatosa ranch, northeast	67			20
Capatosa ranch, southwest	67			20
Cup, northeast of station	71			22
Diaz (Maximo) ranch	67			20
Denton	72			22
Dolores, northwest of station	69			22
Dublin, 2 miles south of	49		347	16
Eltoro ranch	68			20
Espey's ranch	71			22
Farquhar's	122			8, 39
Fieldings, east of north of station	71			22
Fieldings, northeast of station	71			22
Flores ranch	67			20
Fort, south of station	69			22
George, west of station	69			22
Jamerson ranch	74			23
Johnstone, northeast of station	74			23, 24, 27
Johnstone, south of station	75			23, 24, 27
Knob, northeast of station	71			22
Lake, near station	73			23
Margarita ranch, northeast of	71			22
Matthews ranch	71		347	22
Maverick, near	70			22
Maximo Diaz	67			20
McNeill's (P. E.) house	36		346	11
Moore, near station	75			23, 24, 27
Moore, north of station	75			23, 24, 27
Near clump of trees	72			22
Near trees	68			20
Near white house	68			20
Neely's ranch	74			23

Index to positions, descriptions, elevations, and sketches—Continued

Station	Position	Description	Elevation	Sketch
Windmill—Continued.	<i>Page</i>	<i>Page</i>	<i>Page</i>	<i>Figure</i>
Nine, northeast of station	73			23
Nine, south of station	73			23
Norias' house, $\frac{1}{4}$ mile north-northeast of	38		346	12
No wheel	71			22
Orton's, Bellevue	29		345	6
Orvil, east of station	70			22
Orvil, northeast of station	71			22
Orvil, southwest of station, white	70			22
Paloma ranch	73			23
Red, near station	72			22, 23
Red, near station (no wheel)	72			22, 23
Skippers Gap	31			7
Tajone, south of station	71			22
Unidentified (Dimmit County)	72			22
Unidentified (Kinney County)	73			23
Unidentified (Maverick County)	72			23
White, near station	73			23
Winnie north base	140	329		48
Winnie south base	140	329		48
Wireless mast, north, Laredo	69		347	22
Wireless mast, south, Laredo	70		347	22
Wolf	43	192	192	14
Wood	25	177	177	11
Wood's ranch house, cupola	36		346	11
Woodville	132	308		44
Woolly	20	159	159	6, 7
Woolsey	108	282	344	15, 37
Woosley	138	322		46
Word	75	230	230	24
Worsham	97	261	343	33
Worham, standpipe	126		349	40
Wurzbach (U.S.G.S.)	78	235		26
X.I.T.	97	261	343	33
Yellow house with dark roof, cupola, Weatherford	31		345	7
Ygnacio	59	214	214	21
Young	21	161	161	7, 13
Young's (J. B.) house, north chimney	30			6
Yturria	27	181	182	12
Zanke's gin, Seguin, brick chimney	35		345	10
Zapata	58	213	214	21
Zapata:				
Church steeple	69		347	21
Post office flagpole	69		347	21
Zihlman	108	282	344	15, 36
Zyback	89	247	247	30

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